

South African Mollusca described by Ferdinand Krauss: their current status and notes on type material housed in the Naturhistoriska Riksmuseet, Stockholm

by

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ABSTRACT

A complete alphabetical list of all South African taxa described by Ferdinand Krauss is provided. The bulk of Krauss's type material housed in the Stuttgart Museum was lost during World War II, but important holdings of original Krauss material remain in the Swedish Museum of Natural History [Naturhistoriska Riksmuseet], Stockholm. Much of this was collected by the Swede, Johan Wahlberg. The validity and status of this as type material is discussed, together with the presently accepted taxonomic standing and generic relationships of the taxa. Type material of 54 Kraussian taxa has been located in Stockholm. The existence of additional type material in other institutions, or the possibility thereof, is also indicated.

Diodora kraussi is proposed as a *nomen novum* for *Fissurella australis* Krauss, 1848 [non Philippi, 1845].

INTRODUCTION

Christian Ferdinand Friedrich Krauss (1812–1890) has been described as the father of South African malacology. Not only did he make a significant collection of molluscs in South Africa, but he also wrote the first book devoted (almost exclusively) to the molluscan fauna of the region, *Die südafrikanischen Mollusken* (Krauss 1848). Details of his travels and experiences have been documented in a number of sources (Krauss 1973, Gunn & Codd 1981, Kilburn & Rippey 1982, van Bruggen 1992). The bulk of the original material upon which *Die südafrikanischen Mollusken* was based, including the new species, was housed in the *Königliches Naturalien-Cabinet zu Stuttgart*, now the *Staatliches Museum für Naturkunde* in Stuttgart (Stuttgart Museum), of which Krauss later became director. Unfortunately, the greater part of this is now missing, believed to have been destroyed during World War II. With the exception of five polyplacophoran taxa, most of the surviving type material (representing only 15 taxa) was discussed by Janus (1961). The Polyplacophora were to be covered in a subsequent paper, but this has never been published.

Although many of Krauss's taxa represent common species with well established nomenclature, the disappearance of this material represents a significant loss to malacology in South Africa. Krauss's work, however, was based not only on material that he himself had collected, but also on material collected by contemporary explorer-naturalists, notably Johan August Wahlberg (1810–1856) (Fig. 1). Wahlberg, a Swede, came to South Africa on a natural history expedition in response to an invitation sent to the Royal Swedish Academy of Sciences by the then Swedish-Norwegian Consul in Cape Town (J. A. Letterstedt). Although Wahlberg was to some extent funded by the Academy, he had to supplement this with money from his own savings, by selling natural history material (in particular ivory) and by borrowing money from Letterstedt. The bulk of the material that he collected was sent back to the Natural History Museum of the Royal Swedish Academy of Sciences in Stockholm, now the Naturhistoriska Riksmuseet (Swedish Museum of Natural History, SMNH), arriving there mainly between 1839 and 1841 (Lönnerberg 1916). Further biographical information and detailed accounts of his travels have been given by several authors (Gyldenstolpe 1934, Brink 1955, Gunn & Codd 1981) and in a recently published English translation of his own journal (Wahlberg 1994).

Much of Wahlberg's molluscan material was subsequently sent for examination to Krauss at the Stuttgart Museum by the director of the SMNH, Professor S. L. Lovén (1809–1895). It was this material that Krauss used to supplement his own molluscan collections whilst writing *Die südafrikanischen Mollusken*, and the descriptions of at least 35 taxa were based partly or wholly on Wahlberg's material. It is evident that Krauss retained some of these Wahlberg specimens in Stuttgart whilst others he returned to Stockholm, together with duplicate material of species that he had collected himself. The SMNH Mollusca collection has never been thoroughly examined for original Wahlberg/Krauss material. Although some lots had previously been identified as types, it was evident that additional material of potential type status was present in the general collection (A.W. *pers. obs.*). The significance of this material is greatly increased in the light of the almost total loss of Krauss's types from the Stuttgart Museum. Consequently, the authors undertook a systematic search of the SMNH collection to retrieve potential type material of South African molluscs described by Krauss.

To facilitate this, a complete list of the molluscan taxa, including varietal names, described in *Die südafrikanischen Mollusken* was compiled. Since there has been no comprehensive assessment of Krauss's taxa, it was decided to combine the survey of the SMNH collection with a study of all Krauss's South African molluscan taxa and to present this as a catalogue discussing their validity, current taxonomic placement, the availability of original material and the type status of this. Discussed in a separate section are a further six names for South African marine molluscan taxa that Krauss described in 1852, based on the collections of the botanist Carl Zeyher. Only one of these is now considered valid.

The taxa are treated alphabetically by specific name, using the original nomenclatural combinations. It should be noted that adjectival species names will frequently need to be changed from their original form to make them agree in gender with the genus name to which they are now referred. The type locality, as originally

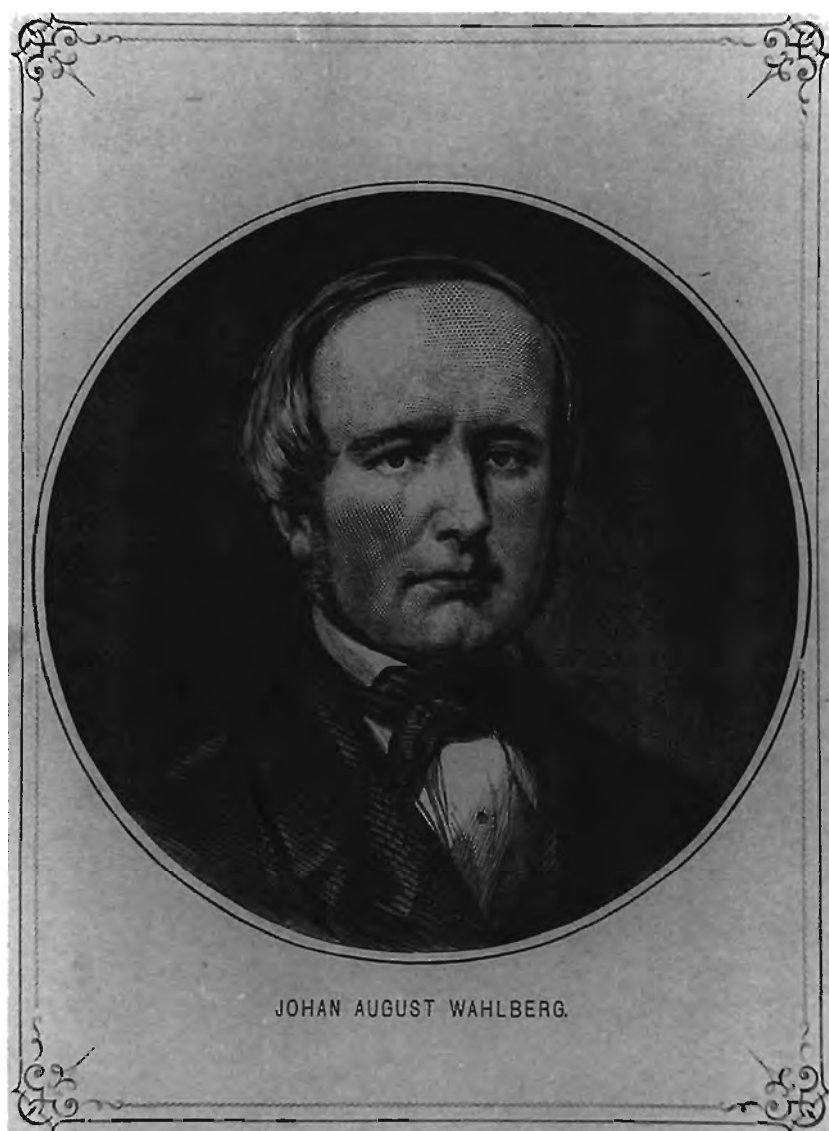


Fig. 1. Copy of engraving of J. A. Wahlberg (archives of the Royal Swedish Academy of Sciences).

cited, is given for each taxon, followed by the name of the collector (if cited). Details of material in SMNH (if any) are then given, with comment on the authenticity and status of this as type material, and the possible existence of type material elsewhere. Finally, an indication of the currently accepted status and generic referral of the taxon is given (and a reference thereto). Names that are currently recognized as the oldest available names for valid taxa are printed in bold. Neotypes and lectotypes have not been designated as this is more appropriately done by specialists undertaking

revisionary studies. Taxa for which extant type material is available are marked with one asterisk, and two asterisks when this is in SMNH.

Die südafrikanischen Mollusken also contains descriptions of a number of taxa that Krauss credited to himself, but which were in fact published as manuscript names in earlier publications by other authors (notably those of Küster, Pfeiffer and Philippi). This stems from the fact that Krauss circulated specimens and lists containing manuscript names to colleagues prior to 1848. Authorship of such names should be cited for example as, 'Krauss in Pfeiffer, 1846'. None the less, since they are Kraussian names, they are included in this catalogue. Connolly (1939) treated Stuttgart Museum specimens of the species concerned as type material (some remains extant according to Janus 1961) and although van Bruggen (1992: 82) legitimately questioned this, it seems pragmatic to accept Connolly's assumption, in the absence of evidence to the contrary. Krauss in turn published a number of manuscript names employed by his contemporaries (viz.:— *Marginella capensis* Dunker in Krauss, 1848, *Buccinum cereale* Menke in Krauss, 1848 and *Delphinula granulosa* Dunker in Krauss, 1848). These we also include in the main list.

The catalogue comprises 158 names (excluding manuscript names and names which Krauss wrongly attributed to himself, e.g. *Fissurella caffra*), of which 114 refer to marine/estuarine taxa (94 as full species, 20 as varieties), 27 to terrestrial taxa (24 as species, 3 as varieties) and 16 to freshwater taxa (13 as species, 3 as varieties). Of these 56, 24 and 11 (49 %, 89 % and 69 %) respectively, are currently used as the valid names for distinct taxa.

AUTHENTICITY OF MATERIAL AS TYPES

In some instances the authenticity of specimens as types has been easy to establish, e.g. when Wahlberg was cited as the collector, the SMNH lot was from the type locality and when there is a label written in Krauss's handwriting. However, when one or more of these parameters is not the case, the position is not always so clear-cut. Additional evidence in support of type status was sometimes available in the form of a list, in Krauss's own handwriting, of some of the material that he had received from, or was sending to, Prof. Lovén in Stockholm (Table 1, Fig. 10). The material sent to Stockholm was largely duplicate material, some being returned Wahlberg specimens and others being samples of taxa collected by Krauss himself, sent in exchange. This list was obtained from the archives of the Royal Swedish Academy of Sciences (*per* Christer Wickström) and is dated 17 February 1847, Stuttgart. This material was thus seen by Krauss before the publication of *Die südafrikanischen Mollusken* and may legitimately be considered type material. It is likely that more than one such exchange of material took place and indeed there are specimen lots with Krauss labels belonging to taxa not included in the one existing list (e.g. *Cyrena africana* and *Cyclas capensis*). Evidently no further lists have been retained.

Broadly speaking, specimens of Krauss's taxa in SMNH fall into five principle categories:

1. From the type locality, collected by the cited collector (if given), with a Krauss label and included in either the list of received or exchanged material (e.g. *Patella dunkeri*, *Donax exarata* and *Turritella knysnaensis*). Herein deemed types.

2. As 1), but not included in the lists of either received or exchanged material (e.g. *Cyclas capensis* and *Planorbis pfeifferi*). It is impossible to determine whether the specimens were seen by Krauss before or after the publication of *Die südafrikanischen Mollusken*. On account of the loss of the bulk of the Stuttgart Museum types, we have in such cases erred on the side of pragmatism and also consider these specimens to be types.
3. As 1), but without a Krauss label; included in list of exchanged material (e.g. *Chiton literatus* and *Helix loveni*). Herein deemed probable types; Krauss label presumed lost.
4. As 1), but without a Krauss label and not included in list of exchanged material, but included in the list of material of which Krauss acknowledged receipt (e.g. *Bulimus linearis* and *Pleurobranchus granulatus*). In most cases there is no proof that Krauss returned such material to Stockholm, and any now present there may simply be the retained portions of larger samples, only part of which was sent to Krauss. The presence of Krauss labels with some of the lots of species included in this list indicates, however, that Krauss did sometimes return the samples or part of them (e.g. *Patella dunkeri*), but for those without Krauss labels there must always be an element of doubt and they can at best be considered possible types.
5. Authentic Wahlberg material without a Krauss label of taxa not included in either the list of received or exchanged material (e.g. *Arca natalensis* and *Physa wahlbergi*). Since there is no evidence that Krauss had seen these specimens they cannot be considered types. However, in many cases (e.g. *Succinea striata*) this material was clearly part of the original lot collected by Wahlberg and, in the absence of extant type specimens elsewhere, would make appropriate material for neotype designation, should this become necessary.

There are additional variable parameters over and above the five basic ones listed above and these have to be assessed in the light of all the available data for the particular taxon concerned. The above categories, however, have been useful as a guideline in maintaining uniformity.

TABLE 1

Krauss's own taxa included in the one available list of material communicated between Krauss and SMNH (dated 1847). This comprised: 1) material sent to Krauss for examination and 2) duplicates that Krauss sent to SMNH in exchange. The latter included some returned Wahlberg material.

1. Received for examination (<i>Zur Ansicht erhalten</i>)	2. For exchange from duplicates (<i>Im Tausch erhalten aus den Doublette</i>)
Shells (<i>Schalen</i>)	Shells (<i>Schalen</i>)
<i>Bulimus linearis</i>	<i>Bulimus caffer</i> [in Pfeiffer, 1848]
<i>Bulimus natalensis</i>	<i>Bulimus turritiformis</i>
<i>Helix aenea</i>	<i>Cyrena gauritziana</i>
<i>Helix microscopica</i>	[ms name = <i>C. africana</i> var. <i>olivacea</i>]
<i>Helix rivularis</i>	<i>Donax exarata</i>
<i>Helix vernicosa</i>	<i>Fissurella incarnata</i>
<i>Iridina wahlbergi</i>	<i>Helix aprica</i>
<i>Nerita coccinea</i> [ms name]	<i>Helix congelana</i> (sic) [ms name]
<i>Patella dunkeri</i>	<i>Helix loveni</i>
<i>Helix pinguis</i>	<i>Limnaea succinea</i> Desh [= <i>natalensis</i> Kr.]

TABLE 1 (continued)

Krauss's own taxa included in the one available list of material communicated between Krauss and SMNH (dated 1847). This comprised: 1) material sent to Krauss for examination and 2) duplicates that Krauss sent to SMNH in exchange. The latter included some returned Wahlberg material.

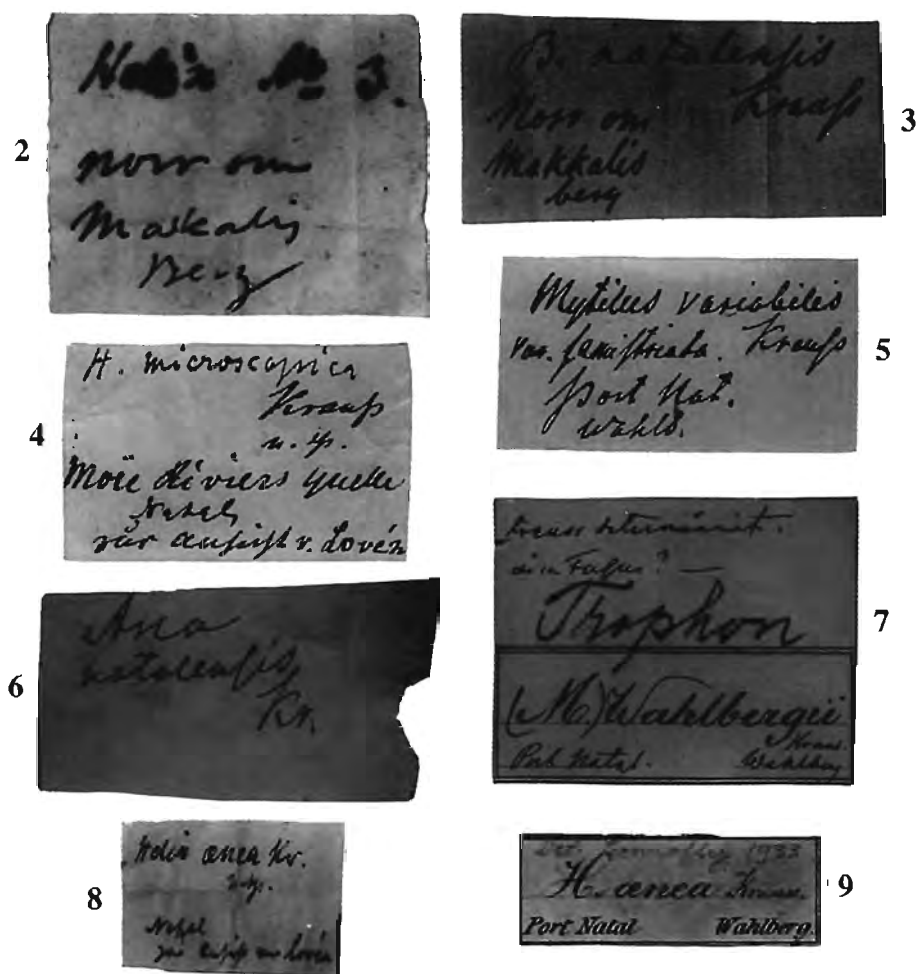
1. Received for examination (<i>Zur Ansicht erhalten</i>)	2. For exchange from duplicates (<i>Im Tausch erhalten aus den Doublette</i>)
In alcohol (<i>in Weingeist</i>)	<i>Litorina knysnaensis</i> [in Philippi, 1847]
<i>Chiton oniscus</i>	<i>Litorina natalensis</i> [in Philippi, 1847]
<i>Chiton tigrinus</i>	<i>Physa natalensis</i>
<i>Chiton pustulosus</i>	<i>Physa tropica</i>
<i>Pleurobranchus granulatus</i>	<i>Physa turrita</i> [ms name? = <i>P. wahlbergi</i>]
	<i>Physopsis</i> gen. n. <i>Pupa fontana</i>
	<i>Pupa pfeifferi</i>
	<i>Pupa wahlbergi</i>
	<i>Turbo natalensis</i>
	<i>Turritella knysnaensis</i>
	<i>Unio natalensis</i> [ms name = <i>caffer</i> Kr.]
	<i>Vitrina natalensis</i>
	In alcohol (<i>in Weingeist</i>)
	<i>Chiton literatus</i>
	<i>Chiton wahlbergi</i>

STATUS OF TYPES

The type concept was not well established at the time of Krauss's writing and he appears never to have identified any one specimen as the type. Consequently, all material which is believed to have been examined by him in drawing up the description must be considered syntypes, unless there is evidence that only one specimen was available. In the latter case, if still extant, the specimen must be considered the holotype. Connolly (1939), during the course of his work on southern African non-marine molluscs, loaned much original material from Stuttgart Museum (and a lesser amount from Stockholm). In many cases he stated 'type of... in Stuttgart' (or occasionally '... in Stockholm'). In some of these instances he was quite precise and gave the dimensions of the specimen, sometimes based his description upon it and occasionally figured it. These, following ICZN Art. 74, constitute lectotype designations and any additional types of these species must thus be considered paralectotypes. In other cases, although he mentioned a type, there would, unless it was a singleton, have been no means of identifying the specimen concerned. Such vague citing of 'the type' cannot be considered lectotype designation and any additional types of these species must be considered syntypes. Evidently, none of the non-marine lectotypes or paralectotypes remains extant in Stuttgart Museum. In the case of marine taxa, the bulk of extant types are syntypes. Lectotypes have been designated only for those few taxa discussed by Janus (1961). Neotypes have been designated in a few instances where all type material has been deemed to be lost, e.g. *Cerithium crassilabrum* (Houbrick 1992: 69) and *Patella oblecta* (Robson 1986: 315).

LABELLING

Original labels have been of considerable use in determining the authenticity of SMNH specimens as types. Fortunately, a good deal of the original labelling remains, the oldest being that of Wahlberg himself. These labels usually indicate some sort of



Figs 2-9. Examples of labels associated with Wahlberg-Krauss specimens in SMNH. 2. Original Wahlberg label - 'Helix No 3, norr om Maskalis Berg' (cf. *Bulimus natalensis*). 3-6: Examples of labels in Krauss's hand. 3. '*Bulimus natalensis* Krauss, norr om Makkalis berg'. 4. '*H. [elix] microscopica* Krauss n. sp. Moie Riviers Quelle Insel, zur Aufsicht von Lovén'. 5. '*Mytilus variabilis* var. *semistriata*. Krauss Port Nat. Wahlb.'. 6. '*Arca natalensis* Kr', written on back of Wahlberg label. 7. Exhibition label for *M. [urex] wahlbergi*. 8-9. Original Krauss label and more recent, pre-printed label for '*Helix aenea* Kr.' Note how locality 'Natal' on Krauss label has become 'Port Natal' on pre-printed label.

guess on Wahlberg's part as to the generic identity of the specimens, followed by a number and a locality (Fig. 2), e.g. '*Helix* No 3, norr om Maskalis Berg [north of Magaliesberg]' (see *Bulimus natalensis*). Subsequently, many of the specimens sent to Krauss were returned with a label in Krauss's own handwriting giving his identification of the species (Figs 3-5). Many also state 'zur Aufsicht von Lovén' [for examination from Lovén] (Figs 4, 8). The authenticity of these Krauss labels has

been established by comparing them with letters sent by Krauss to Lovén (in the archives of the Royal Swedish Academy of Sciences) and those illustrated by van Bruggen (1992). In this context, the list of received/exchanged material mentioned above has been particularly useful, for it gives actual examples of many of the species names in Krauss's hand-writing (Fig. 10).

In a number of other cases, Wahlberg material has been put on display and thus separated from the original labels, which have subsequently been lost (e.g. *Limnaeus natalensis* and *Murex wahlbergi*), the only ones remaining being the exhibition labels (Fig. 7). Many of these exhibition labels are pre-printed with the wording 'Port Natal [=Durban]...Wahlberg' (Fig. 9). Although Wahlberg certainly did collect a good deal of material in the Durban area, it appears that these labels and the Port Natal locality in general have been used rather indiscriminately, sometimes for material which was originally localised only to 'Natal' (e.g. *Helix aenea* Figs 8, 9) and sometimes for material that could not possibly have been collected there and which might not have even been collected by Wahlberg (e.g. *Turritella knysnaensis*). Nothing of significance should be inferred from this 'Port Natal' locality.

LOSS OF STUTTGART MUSEUM MATERIAL – KRAUSS TYPES IN BMNH

Janus (1961) postulated that one possible explanation for the loss of some of the Kraussian molluscan material from the Stuttgart Museum was not that it had been destroyed by World War II bombing, but that Connolly, who had borrowed much of the non-marine material, had failed to return it due to the outbreak of war. According to Janus, this explanation was refuted by the Natural History Museum, London (BMNH), where Connolly's collection is now housed, claiming that it contained no Stuttgart Museum material.

However, some Krauss types are indeed present in BMNH (e.g. *Physa diaphana*, Naggs, *pers. comm.*) and were even distributed by Connolly to other institutions (e.g. Natal Museum). Indeed, Connolly himself acknowledged the existence of Krauss types in his own collection and the BMNH (e.g. *Helix aprica* and *Physa tropica*). It is possible that some form of agreement was reached between Connolly and the Stuttgart Museum in this regard, the correspondence for which has subsequently been lost. It is evident also that Krauss himself sent material to the BMNH (e.g. 'paratypes' of *Cyclas capensis*, cf. Connolly 1939: 624).

ADDITIONAL EXTANT MATERIAL

Besides the Kraussian type material in Stockholm, Stuttgart and BMNH, there is good reason to believe that additional original material, perhaps meriting recognition as type material, may be present in other museums. Dr Ronald Janssen has kindly provided us with a list of such material in the Senckenberg Museum, Frankfurt. The specimens concerned were received either directly from Krauss himself or were acquired in 1989 as part of the H. G. Bronn collection from the Zoological Institute of Heidelberg University (Janssen, *in lit.*), Bronn himself having received the material from Krauss. Details are given under the respective taxon names and in six cases this is the only extant Kraussian material known. Van Bruggen (1992: 83) indicated that Krauss corresponded with the authorities at the Leiden Museum and

<u>Südafrikanien</u>	
1. <u>zur Ansicht erhalten</u>	
<u>A. Schalen.</u>	
<i>Vitrina cornes</i> Jfr an <i>Helix</i> jun.	Bu
<i>Helix anea</i> Krmp.	vi
— <i>vermicosa</i> Kr.	He
— <i>rimularis</i> Kr.	—
— <i>microscopica</i> Kr.	—
<i>Cyrtostoma</i> meist nicht vom Kopf, ist nur postum: P. trans-	Pa
lucidum kann zu verhoffen.	—
<i>Palimnion natalensis</i> Kr.	Bu
— <i>linearis</i> Kr.	—
<i>Patella Dunkeri</i> Kr.	Lin

anische Conchylien

2. Im Tausch erhalten aus den Doppelletten

<u>A. Schalen.</u>
<i>Stella physia</i> L.
<i>Vitrina natalensis</i> Kr.
<i>Helix Congelana</i> Kr. jun.
— <i>lobeni</i> Kr.
— <i>aprica</i> Kr.
— <i>pinguis</i> Kr.
<i>Pupa Wahlbergi</i> Kr.
— <i>fontana</i> Kr. (J. Klause)
— <i>Pfeifferi</i> Kr.
<i>Palimnion caffer</i> Kr.
— <i>curviformis</i> Kr.
<i>Lymnaea caerulea</i> Kr.
— <i>succinea</i> Bloch.
<i>Physa</i> D. A. Kr.

Fig. 10. Sample of Krauss's handwriting from the list of material that he had received from or exchanged with the SMNH (cf. Table 1) [from archives of Royal Swedish Academy of Sciences].

exchanged material with them, including specimens of his own southern African taxa. It is probable that similar exchanges took place with other museums in Europe (e.g. Copenhagen, van Bruggen 1992: 83) and thus Kraussian type material may prove to be quite widely dispersed. It is also possible that specimens of some of the taxa collected by Zeyher and described by Krauss in 1852, are in the Humboldt University Museum, Berlin. The same also applies to material of Dunker manuscript names published by Krauss (cf. *Delphinula granulosa* Dunker in Krauss, 1848).

It is clear, however, that the bulk of the type material of Krauss's taxa was housed in the Stuttgart and Stockholm museums, since Krauss based his work on specimens in these collections. Other museums are likely to house only isolated samples of Krauss's material, when the original lots were large. The importance of such samples, however, is increased in view of the subsequent loss of most of the Stuttgart material.

NOTE ON LOCALITIES

A number of the localities given by Krauss are rather obscure places or are now known by different names. These, with an indication of their location and current names are listed below:

Affenfluss [= Apiesrivier] – a small river running northwards through Pretoria, after which it joins the Tshwane, Pienaars and Plat Rivers flowing to the north-west, eventually joining the Crocodile River and ultimately the Limpopo.

Gauritzfluss – Gourits River (*Gouritsrivier*), west of Mossel Bay (Krauss 1973: 33).

Lepenulafluss [Lepenula River] – Olifantsrivier; the section of the river visited by Wahlberg was evidently in the region of present day Groblersdal, Mpumalanga.

Maskalis Berg – Magaliesberg, west of Pretoria.

Mooi Riviers oog [= source of the Mooi River] – this is the 'Transvaal' Mooi River which arises to the south-west of the Magaliesberg (in the present North West Province) and flows southwards into the Vaal River and ultimately the Orange River. Wahlberg also collected molluscan material beside the 'Natal' Mooi River, probably in the vicinity of the present day town of Mooi River (e.g. *Helix microscopica* and *H. rivularis*).

Mt Mohapaani – Witfonteinrand, near Thabazimbi, Northern Province.

Natalbai [Natal Bay] – Durban Bay.

Natalpunt [Natal Point] – Durban Bluff.

Pieter Mauritzburg – Pietermaritzburg.

Port Natal – Durban.

ABBREVIATIONS

BMNH – The Natural History Museum, London.

NMSA – Natal Museum, Pietermaritzburg.

NNML – Nationaal Natuurhistorisch Museum, Leiden.

SMF – Forschungsinstitut und Naturmuseum Senckenberg,
Frankfurt am Main.

SMNH – Naturhistoriska Riksmuseet, Stockholm.

ZMHB – Museum für Naturkunde der Humboldt-Universität, Berlin.

NEW TAXA DESCRIBED IN 'DIE SÜDAFRIKANISCHEN MOLLUSKEN' (KRAUSS 1848)

abbreviata, as variety of *Venus paupercula* Krauss, 1848 – Krauss, 1848: 11, pl. 1 fig. 10. 'In der Natalbai, häufig'. No contemporary material in SMNH.

Taxonomy: Previously considered a synonym of *Cytherea hebraea* Lamarck, 1818 (e.g. Barnard 1964: 502, as *Pitaria*), this taxon is now regarded as a distinct species belonging to the genus *Pitar* Römer, 1857 (Kilburn & Rippey 1982: 194, 217). [Veneridae]

acuminata, *Arca* – Krauss, 1848: 14, pl. 1, fig. 11. 'In litore natalensi; rara'. No contemporary material in SMNH.

Taxonomy: Traditionally treated as an extreme form of *Arca avellana* Lamarck, 1819 (e.g. Barnard 1964: 369), but recently shown to be a distinct species (Oliver & Chesney 1994: 23). [Arcidae]

acuta, *Planaxis* – Krauss, 1848: 103, pl. 6, fig. 2. 'In litore natalensi'. No contemporary material in SMNH.

Taxonomy: Reportedly a synonym of the Indo-West Pacific *Planaxis niger* Quoy & Gaimard, 1834 (Adam & Leloup 1938: 97) and probably referable to the genus *Supplanaxis* Thiele, 1929, but anatomical confirmation required. *Planaxis acutus* Menke, 1851 [= *Planaxis obsoletus* Menke, 1851], is a junior primary homonym. [Planaxidae]

****aenea**, *Helix* – Krauss, 1848: 75, pl. 4, fig. 18. 'In terra natalensi; legit J. A. Wahlberg'. SMNH material: One specimen from 'Natal' collected by Wahlberg, with a Krauss label (Fig. 8) and a pre-printed display label (Fig. 9) (SMNH Type Coll'n 4942).

Type status: Syntype. Connolly's mention of 'the type' in Stuttgart (Connolly 1939: 195) is not sufficient to constitute a lectotype designation and any extant types must be considered syntypes. Since this species was listed as being amongst material that Krauss received from Stockholm (Table 1) and the specimen bears a Krauss label, it should be considered a syntype. It is probably the only extant original specimen of the species.

Taxonomy: A species of *Trachycystis* s. s. Pilsbry, 1893 (Connolly 1939: 195). [Charopidae]

****africana**, *Cyrena* – Krauss, 1848: 8, pl. 1, fig. 8. 'In flumine Gauritz, provincia Zwellendam. (Krauss); in flumine Lepenula, (Wahlberg); in parte superiore fluminis Nili, (Parreyss)'. SMNH material: One complete specimen, with a Krauss label, stating 'Cyrena gauritziana, Gauritzfluss, Coloni' (SMNH Type Coll'n 4505).

Type status: Syntype. Connolly's discussion of the type material in Stuttgart is too vague to constitute a lectotype designation (Connolly 1939: 620–1) and any extant types must be considered syntypes. Although *C. africana* was not included in the list of duplicate material sent/returned to Stockholm, *C. gauritziana*, an earlier ms name for the same species, was (Table 1) (see also *olivacea* var.). The Krauss label associated with the specimen and the locality given, indicate that it originated from Krauss and it may thus be considered a syntype. It was almost certainly a specimen that Krauss himself collected and sent in exchange to SMNH.

Note that Krauss originally had material of this species only from the 'Gauritz River', which he provisionally named *gauritziana* and some of which he distributed under that name (e.g. the above specimen). Later, he obtained Wahlberg material from the Lepenula River, which caused him to revise his nomenclature. It seems his final decision was that there was one species (*africana*) that was divisible into two varieties, *olivacea* (Gauritz and Lepenula rivers) and *albida* (Lepenula River). The name *C. gauritziana* was published only in the synonymy of var. *olivacea*, but it must also be a synonym of *C. africana*, since *olivacea* appears to be nothing more than the typical variety of the species. Additional types may be present in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: Treated as a subspecies of *Corbicula fluminalis* (Müller, 1774) by Mandahl-Barth (1988: 116) and Daget (1998: 168). [Corbiculidae]

***africana**, *Littorina* – Krauss in Philippi, 1847 in 1842–50: 199, pl. 4, fig. 10; Krauss, 1848: 102. 'Caput Bonae Spei' [Philippi]; 'in der Algoabai' [Krauss]. No contemporary material in SMNH. Lectotype (des. Janus 1961: 5, pl. 3, figs 1, 2) and one paralectotype in Stuttgart Museum (MT106 and 1060 respectively). Additional *ex* Krauss material in Senckenberg Museum (SMF 314707/1 - Algoa Bay, Bronn Coll'n).

Taxonomy: Traditionally regarded as a distinct species and placed in *Littorina* Férussac, 1822 (Rosewater 1970: 476; Kilburn & Rippey 1982: 50), but more recently Reid (1989: 99) has tentatively placed it in *Nodilittorina* (*Echinolittorina*) Habe, 1956, suggesting also that it might not be distinct from *Nodilittorina knysnaensis* (Krauss in Philippi, 1847) (see *knysnaensis*, *Littorina*). [Littorinidae]

****africana**, *Physopsis* – Krauss, 1848: 85, pl. 5, fig. 14. 'Port Natal; legit J. A. Wahlberg'. SMNH

material: Six specimens collected by Wahlberg in 'Port Natal' (SMNH Type Coll'n 2115); no Krauss label.

Type status: Probable syntypes. Connolly's mention of 'the type' in Stuttgart (Connolly 1939: 511) is not sufficient to constitute a lectotype designation and any extant types must be considered syntypic. Since this species was listed (as '*Physopsis* n. gen.') amongst duplicate material sent to Stockholm by Krauss (Table 1), the SMNH specimens may be regarded as probable syntypes. Any original Krauss labels are presumed lost.

Taxonomy: A species of *Bulinus* Müller, 1781, type species (by monotypy) of the taxon *Physopsis* Krauss, 1848, which is usually treated as a subgenus of *Bulinus* (Brown 1994: 209). [Planorbidae]

*****africana***, as variety of *Succinea amphibia* Draparnaud, 1801 – Krauss, 1848: 73. '*Im Limpopofluss von J. A. Wahlberg gesammelt*'. SMNH material: Two specimens, from Limpopo River, collected by Wahlberg (SMNH Type Coll'n 4943).

Type status: Paralectotypes. Connolly's figure of 'the type' in Stuttgart (Connolly 1939: 440, pl. 15, fig. 1) may be taken to constitute a lectotype designation, but the specimen is presumed lost. Any existing type material should thus be regarded as paralectotypes. Although the SMNH specimens were obviously part of the original sample collected by Wahlberg and one was figured as a 'paratype' by Connolly (1939: pl. 15, fig. 2), there is no evidence that they were ever seen by Krauss (there is no mention of the species in the list of received/exchanged material – Table 1). Connolly's reasons for considering them 'paratypes' are not apparent, but there is an exhibit label with this material and thus a possibility that an earlier Krauss label could have been discarded. In view of the loss of the Stuttgart material, we accept Connolly's opinion and consider the specimens paralectotypes. The specimen illustrated by Connolly is here refigured (Fig. 11).

Taxonomy: Treated as a distinct species of *Succinea* Draparnaud, 1801, by Connolly (1939: 440). [Succineidae]

*****albida***, as variety of *Cyrena africana* Krauss, 1848 – Krauss, 1848: 9. '*In parte superiore fluminis Nili (Parreyss); in ramo albo Nili (Dr. Veit); in flumine Lepenula (Wahlberg)*'. SMNH material: 29 complete specimens collected by Wahlberg from '*fluss Lepenula*', with Krauss label (SMNH Type Coll'n 4507).

Type status: Syntypes. Connolly's mention of 'the type' in Stuttgart (Connolly 1939: 622) is not sufficient to constitute a lectotype designation and any extant types must be considered syntypes. Although there is no mention of this variety in the list of received/exchanged material (Table 1), the SMNH specimens were obviously part of the original lot collected by Wahlberg and, since a Krauss label is present, they may be considered syntypes. The single large specimen discussed by Krauss is included in this lot.

Taxonomy: Not considered distinct from the typical form (see above) (Mandahl-Barth 1988: 114; Daget 1998: 168). [Corbiculidae]

albofasciata, as variety of *Siphonaria variabilis* Krauss, 1848 – Krauss, 1848: 60, pl. 4, fig. 4b; '*Auf den Felsen-Terrassen am Natalpoint; nicht häufig*'. No contemporary material in SMNH.

Taxonomy: Treated as a separate species by Hubendick (1946: 60), but now considered merely a form of *Siphonaria concinna* Sowerby, 1824 (Chambers & McQuaid, 1994: 265). [Siphonariidae]

*****aprica***, *Helix* – Krauss, 1848: 77, pl. 4, fig. 26. '*In terra natalensi; legit J. A. Wahlberg*'. SMNH material: 17 specimens collected in 'Port Natal' by Wahlberg (SMNH Type Coll'n 2107). No Krauss label.

Type status: Probable paralectotypes. Connolly's description of 'the type' in Stuttgart (Connolly 1939: 238) constitutes a lectotype designation, but the specimen is now presumed lost. The species was listed amongst the duplicate material that Krauss sent/returned to SMNH (Table 1). Thus even though there is no Krauss label with the SMNH specimens, they may be considered probable paralectotypes.

This is a mixed lot containing at least four species. Some resemble the figured specimen with a relatively rounded shoulder, whilst others represent the form described later by Connolly (1939: 239) as *Trachycystis conica* (holotype originally in Stuttgart Museum, now presumed lost). Connolly had additional 'types' of both *aprica* and *conica* in his personal collection (now in BMNH); one of *aprica* has been figured (Connolly 1939, pl. 7, figs 6–8). In the absence of extant types in Stuttgart, these BMNH specimens must now be taken to be definitive of the respective species.

Taxonomy: A species of *Trachycystis* Pilsbry, 1893, (Connolly 1939: 238). [Charopidae]

****argenvillei***, *Patella* – Krauss, 1848: 49. '*In sinu tabulari; rara*'. No contemporary material in SMNH. Lectotype (des. Janus 1961: 4, pl. 2, figs 1–3) in Stuttgart Museum (MT 114). Additional paralectotypes may be present in Leiden Museum (van Bruggen 1992: 83).

Taxonomy: A valid species, traditionally referred to *Patella* subgenus *Scutellastra* H. & A. Adams, 1854, but *Scutellastra* was recently shown to be generically distinct (S. A. Ridgway *et al.* 1998). [Patellidae]

****argus**, *Octopus* Krauss, 1848: 132, pl. 6, fig. 26. '*In litore natalensi; legit J. A. Wahlberg*'. SMNH material: One small specimen (approximating the dimensions given by Krauss) in alcohol (labelled *Octopus horridus*), from 'Port Natal' collected by Wahlberg (SMNH Type Coll'n 4979). An early label, now badly faded, states '*argus* Kr. Wahlberg'.

Type status: Holotype. Though not stated explicitly, the original description intimates that there was only one specimen and cited Wahlberg as the collector. This SMNH specimen may thus be regarded as the holotype.

Taxonomy: Roeleveld (1974: 752) considered this a synonym of *Octopus horridus* d'Orbigny, 1826, but Norman and Sweeney (1997: 108) were more cautious, stating that *O. argus* merely belonged to the *O. horridus* species-group, and noting that the taxonomy of the group was poorly understood. They stated further that the type material of *O. argus* was no longer extant, but this fortunately proves not to be the case. [Octopodidae]

***aspera**, *Siphonaria* – Krauss, 1848: 60, pl. 4, fig. 5. '*In litore capensi et natalensi*'. No contemporary material in SMNH. Lectotype (des. Janus 1961: 9, pl. 4, figs 1–3) and 18 paralectotypes in Stuttgart Museum (MT 122 and MT 1220–12217 respectively). Additional paralectotypes may be present in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: A junior synonym of *Siphonaria serrata* (Fischer, 1807) (Chambers & McQuaid 1994: 264). [Siphonariidae]

aurantiaca, as variety of *Donax serra* Chem. – Krauss, 1848: 6. '*An der Mosselbai*'. No contemporary material in SMNH.

Taxonomy: Not distinct from *Donax serra* Dillwyn, 1817 (Barnard 1964: 526). [Donacidae]

auriculata, *Modiola* – Krauss, 1848: 20, pl. 2, fig. 4. '*In litore natalensi. In insula Anjouana (Philippi); in mare rubro (Schimper, Rüppell)*'. No contemporary material in SMNH.

Taxonomy: A valid species of *Modiolus* Lamarck, 1799 (Barnard, 1964: 392). [Mytilidae]

australis, *Fissurella* – Krauss, 1848: 67, pl. 4, fig. 10. '*In litore natalensi*'. No contemporary material in SMNH.

Taxonomy: A junior primary homonym of *Fissurella australis* Philippi, 1845 [= *Fissurella oriens* Sowerby, 1835, from South America (McLean 1984: 49)] (noted by Christiaens 1987: 33). In the absence of any junior synonyms, we here rename the species *Diodora kraussi* [nom. n.]. *Glyphis fuscocrenulata* Smith, 1906, which Barnard (1963b: 292) treated as a junior synonym, is a distinct species (D. H., *pers. obs.*). [Fissurellidae]

***badia**, *Fasciolaria* – Krauss, 1848: 110, pl. 6, fig. 12. '*In litore natalensi*'. No contemporary material in SMNH. Lectotype (des. Janus 1961: 7, pl. 3, figs 9–10) in Stuttgart Museum (MT 120).

Taxonomy: A synonym of *Fasciolaria lugubris* Reeve, 1847 (Barnard 1959: 76). The lectotype and original figure represent the typical, cold water, Atlantic Cape form of this species, which occurs from St Helena Bay to False Bay. The locality given with the original description must thus be erroneous. See also Kilburn & Rippey (1982: 214) regarding doubtful validity of the name *F. lugubris*. [Fasciariidae]

benzi, *Trochus* – Krauss, 1848: 99, pl. 5, fig. 32. '*In litore capensi. E collectione cl. Benz*'. No contemporary material in SMNH.

Taxonomy: A species of *Gibbula* Risso, 1826 (Barnard 1963b: 276). [Trochidae]

bilineata, as variety of *Marginella zonata* Kiener, 1841 – Krauss, 1848: 126, pl. 6, fig. 22. '*An der Kapküste*'. No contemporary material in SMNH.

Taxonomy: Not distinct from *Volvarina zonata* (Kiener, 1841) (Kilburn & Rippey 1982: 214). [Marginellidae]

brevis, as variety of *Truncatella ventricosa* Sow. – Krauss, 1848: 87. '*In stagnantibus planitei capensis et Zoetendals-Valley*'. No contemporary material in SMNH. Connolly's figure of 'the type' in Stuttgart Museum (Connolly 1939, pl. 15, figs 32–33), now presumed lost, constitutes a lectotype designation and additional types, should any be found, must be considered paralectotypes.

Taxonomy: A form of *Tomichia ventricosa* Sowerby, 1842 (Connolly 1939: 574 and index). [Pomatopsidae]

****caffer**, *Ancylus* – Krauss, 1848: 70, pl. 4, fig. 13. '*In rivulis montanis prope Pieter Mauritzburg in*

terra natalensi'. There is no contemporary material in SMNH under the name *Ancylus caffer*, but there is a sample (SMNH Type Coll'n 4978) under the earlier Krauss manuscript name *Ancylus obliquus* [non Broderip & Sowerby, 1832, cf. Connolly 1939: 515]. This contains an original Wahlberg label stating 'Port Natal'.

Type status: Possible paralectotypes. Connolly's discussion of 'the type' in Stuttgart (Connolly 1939: 515), citing its dimensions, is sufficient to constitute a lectotype designation, but the specimen is now presumed lost. Although Wahlberg was not cited as collector in the original description, it is most unlikely that SMNH material would have been identified under a Krauss manuscript name, had Krauss himself not seen the specimens. None the less, since there is no Krauss label as proof of this, the specimens can at best be considered possible paralectotypes. Connolly has adequately shown that Krauss merely substituted the name *A. caffer* for this species when he realised that his earlier *A. obliquus* was preoccupied by Broderip & Sowerby's name.

Taxonomy: Type species of *Burnupia* Walker, 1912 (Brown 1994: 163). [Ancyliidae]

****caffer, *Bulimus*** – Krauss in Pfeiffer, 1848: 192; *Bulimus spadicea* Menke in Pfeiffer, 1846, var. Krauss, 1848: 79. 'In monte Mohapaani; legit J. A. Wahlberg'. SMNH material: Originally one lot (SMNH Type Coll'n 4985, 3 specimens) with an old exhibition label stating '*Bulimus spadiceus* Menke, var., Mohapaani Berg, Wahlberg', now divided in two as discussed below. No Krauss label.

Type status: Lectotype and paralectotypes. Connolly (1939) was inconsistent in his discussion of the type material of this taxon. In his text (p. 425) he stated 'type in Stockholm Museum', yet according to his plate legends, the figures he supplied were of the type and a paratype in Stuttgart Museum (pl. 13, figs 24, 25). However, the two specimens illustrated can be identified in the SMNH lot, indicating the figure legend to be in error. Connolly's provision of a figure of 'the type' must constitute a lectotype designation and this specimen is now isolated as such (SMNH Type Coll'n 4985); the two other specimens, one also illustrated by Connolly, are paralectotypes (SMNH Type Coll'n 4968).

There is a further lot in SMNH under the name *Bulimus spadiceus* Mke, reputedly from 'Mohapaani Berg'. However, there is an additional label stating '*Helix vesiculosus*(?)', Port Natal, Wahlberg'. The specimens are over 20 mm in height, darker in colour and clearly represent typical examples of *Edouardia spadicea* (Menke in Pfeiffer, 1846). This species is confined to the coastal regions of KwaZulu-Natal and the Eastern Cape, and the 'Mohapaani Berg' locality must be erroneous. *Helix vesiculosus* is presumably an unpublished manuscript name.

Taxonomy: This taxon was treated as a distinct species of *Edouardia* Gude, 1914, by Connolly (1939: 425), but its identity remains problematic. Krauss's remarks suggest an affinity with *E. mcbeaniana* (Burnup, 1905). The locality data alone are sufficient to indicate it to be distinct from *E. spadicea*. [Ceramidae]

caffer, *Conus – Krauss, 1848: 131, pl. 6, fig. 24. 'In litore capensi et natalensi'. No contemporary material in SMNH. Lectotype in Stuttgart Museum (MT 121) and two paratypes (MT 1210–1), designated by Janus (1961: 8, pl. 3, figs 11–12).

Taxonomy: Kilburn (1971: 51) discussed the interpretation of this name, concluding that Krauss's original figure represents a specimen of *C. mozambicus* Hwass in Bruguière, 1792, and that Janus's lectotype designation should be rejected since it represents a specimen of *C. tinianus* Hwass in Bruguière, 1792. More recently, *C. mozambicus* has itself been considered a synonym of *C. guineensis* Gmelin, 1791 (Kohn 1981: 286, Coomans, Moolenbeek & Wils 1983: 71). *C. caffer* Krauss, 1848, is also a junior secondary homonym of *C. caffer* (Röding, 1798). [Conidae]

****caffer, *Unio*** – Krauss, 1848: 18, pl. 1, fig. 14; 'In fluviis natalensibus, legit J. A. Wahlberg'. SMNH material: Five complete specimens labelled 'Port Nat. Wahlb.' (SMNH Type Coll'n 4499). A Krauss label stating '*Unio caffer* Krauss, zur Aufsicht von Lovén' is also present.

Type status: Syntypes. Connolly's simple statement 'type of *caffer* in Stuttgart' (Connolly 1939: 195) is not sufficient to constitute a lectotype designation and any extant types must be considered syntypes. Although this name was not included in the list of received/exchanged material (Table 1), there was an entry for '*Unio natalensis* Kr' on this list and as Krauss only described one species of *Unio*, it is probable that he changed this manuscript name to *Unio caffer* prior to publication (the somewhat similar *Iridina wahlbergi* was listed separately). In view of this and given that a Krauss label is present, these specimens may be considered syntypes.

Taxonomy: Referred to *Cafferia* Simpson, 1900, by Brown (1967: 486), Mandahl-Barth (1988: 32) and Daget (1998: 68), and to *Unio* Philipsson, 1788, by Appleton (1996: 37). [Unionidae]

caffra, *Fissurella* – Krauss, 1848: 66; 'Am Cap. (Martini)'.

This is not a new species described by Krauss. Since he referred to *Patella caffra* Gmelin, 1789, and cited figures in Martini (1769), Krauss made an error in giving his own name after this species name. Furthermore,

he stated that he did not know the species and evidently had no material available to him. It was not treated by Pilsbry (1890) or Thiele (1912–19), and it is impossible to recognise the species from the cited figures.

cancellata*, *Stomatella – Krauss, 1848: 93, pl. 5, fig. 26. '*In sinu tabulari*'. No contemporary material in SMNH.

Taxonomy: This is a valid species and is type species of the genus *Hybochelus* Pilsbry, 1889. The type locality, however, is erroneous. The species is not part of the South African fauna, but occurs instead in the central Indo-West Pacific (Herbert 1996: 426). [Trochidae]

cancellatum*, *Solarium – Krauss, 1848: 95, pl. 5, fig. 29. '*In sinu Algoënsi*'. No contemporary material in SMNH.

Taxonomy: A junior primary homonym of *Solarium cancellatum* Conrad, 1833 (and of Lea, 1833). A replacement name, *kraussii* (placed in *Liotia*) was provided by Gray (1850: 88). As an incorrect original spelling, this has been emended to *kraussi* by Bieler (1993: 309), who also confirmed the architectonicid affinities of the species and referred it to *Pseudotorinia* Sacco, 1892. [Architectonicidae]

*****capensis*, *Cyclas*** – Krauss, 1848: 7, pl. 1, fig. 6. '*In fluvio Knysna, provincia George; frequens*'.

SMNH material: Two complete specimens from Knysna, with Krauss identification label (SMNH Type Coll'n 4497).

Type status: Syntypes. Connolly's discussion of the types in the Stuttgart Museum (Connolly 1939: 624) is not precise enough to constitute a lectotype designation. Since the SMNH specimens come from the type locality and have a Krauss label, they may be regarded as syntypes. They are almost certainly specimens that Krauss himself collected and sent in exchange to SMNH. There are additional syntypes in BMNH, evidently sent by Krauss himself (Connolly 1939: 624). Additional *ex* Krauss material is present in the Senckenberg Museum (SMF 5850/1, *Knysna Fluß*) and perhaps also in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: A species of *Sphaerium* Scopoli, 1777 (Mandahl-Barth 1988: 121, Daget 1998: 208). [Sphaeriidae]

***capensis*, *Limax* (*Limas*)** – Krauss, 1848: 73. '*In provincia capensi*'. No contemporary material in SMNH. There was evidently only one specimen of this taxon available and this must be regarded as the holotype. Connolly (1939: 181) indicated that its remains were in the Stuttgart Museum and figured the shell (pl. 5, figs 15–17), but these must now be presumed lost.

Taxonomy: Most authors (except Connolly 1939) have regarded this as a synonym of the European *Milax gagates* (Draparnaud, 1801), but Sirgel (1985: 474) considered it a valid species for which he created the new genus *Ariopelta*, placing this in a new arionid subfamily, the Ariopeltinae. [Arionidae]

capensis*, *Marginella – Dunker in Krauss, 1848: 125, pl. 6, fig. 21. '*In litore capensi*'. SMNH material:

Eight specimens from '*Cap. b. sp.*' [*Caput Bonum Spei*], collected by Wahlberg, no Krauss label.

Type status: Not types. Since 1) Krauss did not cite Wahlberg as having collected this species, 2) there is no Krauss or Dunker label in the lot and 3) the specimens do not match the figure, they cannot be regarded as types. It should be noted, however, that the specimens have been on display and some of the original labels may well have been lost. Additional (Dunker) material may be in ZMHB.

Taxonomy: A species of *Volvarina* Hinds, 1844 (Kilburn & Rippey 1982: 114). [Marginellidae]

*****capensis*, *Modiola*** – Krauss, 1848: 20, pl. 2, fig. 3. '*In flumine Knysna*'. SMNH material: One complete specimen from 'Knysna', bearing an original Krauss label (SMNH Type Coll'n 4500).

Type status: Syntype. Although this name is not mentioned in the list of exchanged material (Table 1), the specimen is almost certainly one that Krauss himself collected and which he sent in exchange to SMNH.

Taxonomy: A species of *Arcuatula* Jousseume in Lamy, 1919 (Davies 1980: 227). Type species of *Lamya* Soot-Ryen, 1958, a junior synonym of *Arcuatula*. [Mytilidae]

*****capensis*, *Turritella*** – Krauss, 1848: 106, pl. 6, fig. 8. '*In sinu tabulari et Saldanha*'. SMNH material:

Many specimens with two Krauss labels, one stating '*Turritella capensis* Kr. Cap Port Natal' (with the word 'Cap' cancelled), the other is identical, but lacks the word Cap. One also states 'Wahlberg' (SMNH Type Coll'n 4944).

Type status: Possible syntypes. The 'Port Natal' label data is erroneous as the species does not occur east of East London. Although Krauss did not cite Wahlberg as having collected this species, it is probable, since there are so many specimens and his name is mentioned on the label that he was indeed the collector. Krauss is unlikely to have given so much material of one species in an exchange. In view of the presence of Krauss labels with the material, we presume that he saw at least some of it and thus consider the specimens probable syntypes.

Taxonomy: A species of *Protomella* Thiele, 1929 (Kilburn & Rippey 1982: 52). [Turritellidae]

cereale, *Buccinum* – Menke in Krauss, 1848: 122, pl. 6, fig. 17. '*In litore capensi*'. No contemporary material in SMNH.

Taxonomy: A synonym of *Anachis kraussii* (Sowerby, 1844) (Barnard 1974: 689). [Columbellidae]

complanata, as variety of *Crepidula hepatica* Deshayes, 1830 – Krauss, 1848: 69, pl. 4, fig. 12b. '*An der Natalküste, häufig, auch in der Knysnamündung auf Pinna squamifera* Sow.' No contemporary material in SMNH.

Taxonomy: A synonym of *Crepidula porcellana* Lamarck, 1801 (Barnard 1963a: 70). [Calyptraeidae]

concolor, as variety of *Patella variabilis* Krauss, 1848 – Krauss, 1848: 55. '*In litore natalensi*' [...auf den Felsenterrassen der Natalküste sehr gemein]. No contemporary material in SMNH.

Taxonomy: This is the only non-homonymous name that Krauss proposed for this taxon (see *variabilis*, *Patella* below). Although long treated as a species of *Patella* Linnaeus, 1758 (e.g. Kilburn & Rippey 1982: 37), it has recently been transferred to *Helcion* Monfort, 1810 (S.A. Ridgway *et al.* 1998). [Patellidae]

congellana, *Helix* – Krauss, ms. Evidently a manuscript name used by Krauss for the species currently known as *Sheldonia inuncta* (Melvill & Ponsonby, 1899) (see Connolly 1939: 145).

costata, *Mouretia* – Krauss, 1848: 57, pl. 4, fig. 1. '*In litore capensi*'. No contemporary material in SMNH.

Taxonomy: *Mouretia* Sowerby, 1842, is a junior synonym of *Trimusculus* Schmidt, 1818 (Zilch 1959–60: 81). [Trimusculidae]

costulatus, *Planorbis* – Krauss, 1848: 83, pl. 5, fig. 8. '*In Umgani* [Umgeni]-Valley, Natal; non frequens'. No contemporary material in SMNH. Connolly's simple statement 'Type in Stuttgart Museum' is not sufficient to constitute a lectotype designation (Connolly 1939: 489) and extant types, should any be found, must be considered syntypes.

Taxonomy: A species of *Gyraulus* Charpentier, 1837 (Brown 1994: 186). [Planorbidae]

**crassilabrum*, *Cerithium* – Krauss, 1848: 107, pl. 6, fig. 10. '*In litore natalensi*'. No contemporary material in SMNH. Houbrick (1992: 69, fig. 42a–c) designated a Natal Museum specimen as neotype (NMSA 7303/T840).

Taxonomy: A valid species of *Cerithium* Bruguière, 1789 (Houbrick 1992: 68). [Cerithiidae]

**cruciata*, *Fissurella* – Krauss, 1848: 67, pl. 4, fig. 9. '*In litore natalensi*'. No contemporary material in SMNH. Lectotype and one paralectotype (des. Janus 1961: 2, pl. 1, figs 1–3) in Stuttgart Museum (MT 111 and MT 1110 respectively).

Taxonomy: A homonym of *Fissurella cruciata* Gould, 1846, renamed *Glyphis crucifera* Pilsbry, 1890, and currently referred to *Diodora* Gray, 1821 (Barnard, 1963b :293). [Fissurellidae]

***cyaneopunctatus*, *Chiton* – Krauss, 1848: 40, pl. 3, fig. 2. '*In litore capensi*'. SMNH material: One specimen from 'Tafel Bay'. The label states '*Chiton cyaneopunctatus* Krauss, Krauss' (SMNH Type Coll'n 4945).

Type status: Syntype. Although this species was not included in the list of received/exchanged material (Table 1), Krauss's name is repeated on the label, strongly suggesting that the material came from him. Furthermore, since the species is not South African, the specimen could not have been collected by Wahlberg and must have been part of the original sample that Krauss obtained from Baron v. Ludwig. It should thus be considered a syntype. The 'Tafel Bay' locality clearly stems from Krauss's assumption that if the specimens came from the environs of Cape Town, then the likely source was Table Bay. Similar *ex* Krauss material of this species is present in the Senckenberg Museum (SMF 29433/2, Tafelbai), and there may be additional specimens in the Stuttgart Museum (Janus 1961).

Taxonomy: Evidently wrongly localised to South Africa and synonymous with *Ischnochiton lentiginosus* (Sowerby, 1840), from South Australia (Kaas & van Belle 1998: 57). Baron von Ludwig is known to have been responsible for other similar mislocalisations (e.g. *Bankivia varians* Beck [= *B. fasciata* (Menke, 1830)], see Herbert 1992: 389). [Ischnochitonidae]

***cylindrica*, *Modiola* – Krauss, 1848: 21, pl. 2, fig. 2. '*In litore natalensi*'. SMNH material: Three complete specimens from 'Port Natal' collected by Wahlberg, with an original Wahlberg label and a Krauss label (SMNH Type Coll'n 4946).

Type status: Syntypes. Although Wahlberg was not cited in the original description as having collected this species, the presence of a Krauss identification label indicates that Krauss had seen the specimens and they may thus be considered syntypes.

Taxonomy: A species of *Lithophaga* (*Lithophaga*) Röding, 1798 (Kilburn 1977: 205). [Mytilidae]

**decollata*, *Litorina* – Krauss in Philippi, 1847 in 1842–50: 196, pl. 4, fig. 3; Krauss, 1848: 102. '*Ora Natal Africae*' [Philippi]; '*an der Natalküste, wahrscheinlich auch in der Algoabai*' [Krauss]. No contemporary material in SMNH. Lectotype (des. Janus 1961: 5, pl. 3, figs 3, 4) and 26 paralectotypes in Stuttgart Museum (MT107 and 1070–10725 respectively). Two additional *ex* Krauss lots are present in the Senckenberg Museum (uncatalogued, Natal; SMF 314709/3, 'Port Natal', Bronn Coll'n) and others perhaps in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: A synonym of *Nodilittorina africana* (Krauss in Philippi, 1847) (see above and Kilburn & Rippey 1982: 50). [Littorinidae]

dentifera, *Perna* – Krauss, 1848: 28, pl. 2, fig. 9. '*In fissuris scopulorum prope Natalpoint*'. No contemporary material in SMNH.

Taxonomy: Treated as a junior synonym of *Parviperna rupella* (Dufo, 1840) by Kilburn & Rippey (1982: 216), but Oliver (1992: 68) considered this in turn to be a synonym of *Isognomon* (*Parviperna*) *nucleus* (Lamarck, 1819). [Isognomonidae]

**diaphana*, *Physa* – Krauss, 1848: 84, pl. 5, fig. 11. '*In Umgani [Umgeni]-Valley, Natal*'. No contemporary material in SMNH. Connolly's simple mention of 'Krauss's type' (Connolly 1939: 506), which was presumably in Stuttgart Museum and is now lost, does not constitute a lectotype designation. There are, however, three purported 'types' in the Natal Museum (NMSA 3699/T669) which Burnup obtained through exchange with Connolly, as well as seven in Connolly's personal collection in BMNH (reg. no. 1937.12.30.1768–74, Naggs *in lit.*), one of which was illustrated by Connolly (1939, pl. 16, fig. 23). These should all be regarded as syntypes.

Taxonomy: Belongs within the genus *Bulinus* Müller, 1781, and was treated as a valid species thereof by Connolly (1939: 505). Now considered a synonym of *Bulinus tropicus* (Krauss, 1848) (Brown *et al.* 1992: 34). [Planorbidae]

diluta, *Buccinum* (*Bullia*) – Krauss, 1848: 121 [under *Buccinum digitale*]. '*An der Natalküste*'. No contemporary material in SMNH.

Taxonomy: A species of *Bullia* Gray in Griffith & Pigeon, 1834 (Barnard 1959: 133). [Nassariidae]

dubia, *Purpura* – Krauss, 1848: 117. '*An der Kapküste*'. SMNH material: Three specimens from False Bay collected by Wahlberg. No Krauss label.

Type status: Not types. As Krauss did not cite Wahlberg as having collected this species and since there is no Krauss label in the lot, these specimens cannot be regarded as types. The species was not listed amongst the exchange material sent to Stockholm. *Ex* Krauss material, however, is present in the Senckenberg Museum (SMF 314623/1, *Cap bon. spei*, Bronn Coll'n) and perhaps also in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: A valid species, generally thought to belong to *Nucella* Röding, 1798 (e.g. Kilburn & Rippey 1982: 90), but anatomical confirmation of this is required (Kool 1993: 55). [Muricidae]

dunkeri, *Marginella* – Krauss, 1848: 126, pl. 6, fig. 23. '*In litore capensi*'. No contemporary material in SMNH.

Taxonomy: A species of *Volvarina* Hinds, 1844 (Kilburn & Rippey 1982: 114). [Marginellidae]

dunkeri, *Murex* – Krauss, 1848: 112, pl. 6, fig. 14. '*In litore capensi*'. No contemporary material in SMNH.

Taxonomy: For a long time regarded as a synonym of *Ocenebra purpuroides* (Dunker in Reeve, 1845), but maintained as a distinct species and referred to a new genus, *Vaughtia*, by Houart (1995: 129). [Muricidae]

***dunkeri*, *Patella* – Krauss, 1848: 55, pl. 3, fig. 14. '*In litore capensi et natalensi*'. Wahlberg, Dunker'. SMNH material: One specimen, closely resembling the original figure, from Natal, collected by Wahlberg, with a Krauss label (SMNH Type Coll'n 4948).

Type status: Syntype, probably the figured specimen. As there is a Krauss identification label with this lot the specimen should be considered a syntype. The species is included in the list of received material (Table 1), indicating that at least some of this was returned to Stockholm. Additional, *ex* Krauss material is present in the Senckenberg Museum (SMF 313838/7, *Cap bon. spei*, Bronn Coll'n).

Taxonomy: A species of *Helcion* Montfort, 1810 (S.A. Ridgway *et al.* 1998). [Patellidae]

echinulata, *Patella* – Krauss, 1848: 52, pl. 3, fig. 15. '*In sinu tabulari*'. No contemporary material in SMNH.

Taxonomy: Traditionally regarded as a synonym of *Patella granularis* Linnaeus, 1758 (Koch 1949: 503), but Krauss's mention of black granules on the external ribs and his figures of the species, clearly indicate

that it is conspecific with the recently resurrected *P. natalensis* Krauss, 1848 (see below). The Table Bay locality must thus be erroneous. [Patellidae]

elongata, as variety of *Mytilus perna* Lamk. [sic] Linnaeus, 1758 – Krauss, 1848: 24. 'Natalküste'. No contemporary material in SMNH.

Taxonomy: Not distinct from *Perna perna* (Linnaeus, 1758). [Mytilidae]

elongata, *Phasianella* – Krauss, 1848: 104, pl. 6, fig. 3. 'In litore capensi'. No contemporary material in SMNH.

Taxonomy: Belongs to *Tricolia* Risso, 1826, and is probably a valid species (D. H., pers. obs.). [Turbinidae]

****exarata**, *Donax* – Krauss, 1848: 6, pl. 1, fig. 5. 'In litore natalensi. J. A. Wahlberg'. SMNH material: One pair and one single valve from Natal with original Krauss identification label (SMNH Type Coll'n 4496).

Type status: Syntypes. The species is included in the list of exchanged material and these specimens may thus be considered syntypes. The original description stated that Wahlberg was the collector, but the label does not indicate this.

Taxonomy: A synonym of *Donax madagascariensis* Wood, 1828 (Barnard 1964: 528). [Donacidae]

exarata, *Succinea* – Krauss, 1848: 74, pl. 4, fig. 15. 'In stagnis natalensibus'. No contemporary material in SMNH. Connolly's discussion and figures of the type material in Stuttgart Museum constitute a lectotype designation (Connolly 1939: 448, pl. 15, figs 6,7), but the specimen is now presumed lost. Extant material, if any is found, must be considered paralectotypes.

Taxonomy: Treated as a valid species of *Succinea* Draparnaud, 1801, by Connolly (1939: 447). [Succineidae]

fasciata, as variety of *Nerita albicilla* Linnaeus, 1758 – Krauss, 1848: 90. 'Auf den Felsen der Natalküste, sehr gemein'. No contemporary material in SMNH.

Taxonomy: Simply one of the many colour variants of *Nerita albicilla* Linnaeus, 1758 (Barnard 1963b: 202). [Neritidae]

fasciata, *Paludina* – Krauss, 1848: 86, pl. 5, fig. 18. 'In fluviis Knysna et Zoetendals-Valley'. No contemporary material in SMNH. Connolly's discussion and figure of 'the type' in Stuttgart (Connolly 1939: 594, pl. 15, figs 35–36) is sufficient to constitute a lectotype designation, but the specimen is now presumed lost. Extant types, should any be located, must be considered paralectotypes.

Taxonomy: A species of *Assimineia* Fleming, 1828 (Connolly 1939: 594). [Assimineidae]

fasciata, as variety of *Patella variabilis* Krauss, 1848 – Krauss, 1848: 55, pl. 3, fig. 12b. 'In litore natalensi'. No contemporary material in SMNH.

Taxonomy: A homonym of *Patella fasciata* Gmelin, 1791. The only non-homonymous name that Krauss proposed for this species was var. *concolor* Krauss, 1848 (see above). [Patellidae]

fenestrata, *Rissoa* – Krauss, 1848: 86, pl. 5, fig. 20. 'In bysso Pinnae squamiferae G.B. Sow.'. No contemporary material in SMNH.

Taxonomy: A species of *Alvania* s. s. Risso, 1826 (Ponder 1985: 40). [Rissoidae]

ferruginea, *Cyclas* – Krauss, 1848: 7, pl. 1, fig. 7. 'In fluvio Knysna; rara'. No contemporary material in SMNH. Connolly's simple statement 'Type in Stuttgart Museum' does not constitute a lectotype designation (Connolly 1939: 628) and any extant types must be considered syntypes.

Taxonomy: A species of *Eupera* Bourguignat, 1854 (Mandahl-Barth 1988: 130; Daget 1998: 187). The species is not now known to occur much further south than Durban (Appleton 1996: 42) and the original locality given by Krauss may be erroneous (none has been found there since, Appleton *in lit.*). Krauss collected extensively in the Durban area and might have mislocalised the specimens. [Sphaeriidae]

****fontana**, *Pupa* – Krauss, 1848: 80, pl. 5, fig. 6. 'Ad fontem fluvii Mooi; legit J. A. Wahlberg'. SMNH material: Five specimens from 'Mooi Riviers Oog' [source of Mooi River, to the southwest of the Magaliesberg] collected by Wahlberg (SMNH Type Coll'n 2113). No Krauss label.

Type status: Probable syntypes. Connolly's simple statement 'type of *fontana* in Stuttgart' is not sufficient to constitute a lectotype designation (Connolly 1939: 393), and any extant types must be considered syntypes. Although there is no Krauss label in the SMNH lot, the species was listed amongst the duplicate material sent/returned by Krauss to Stockholm (Table 1) and the SMNH specimens may thus be considered probable syntypes. The species was originally collected in large numbers ('Wahlberg hat sie in grosser Anzahl') and there may be additional material in Leiden (van Bruggen 1992: 83).

Taxonomy: A species of *Pupilla* Fleming, 1828 (Connolly 1939: 391). Pfeiffer also published a description of this species, using the same name, in 1848 (Pfeiffer 1848: 355), but since he cited the name as a Krauss manuscript name, it is clearly appropriate to credit it to Krauss. Sherborn (1926: 2478) has already set a precedent for this (see also van Bruggen 1985: 272–273). Connolly (1939: 391) attributed the name to Küster, citing text and figure references in the *Conchylien-Cabinet* and giving the date as 1841. However, both the text and figure for this part of the work were not published until 1850 (Smith & England 1937: 92), and indeed Küster made reference to Pfeiffer's 1848 discussion of the species. [Pupillidae]

fulgurans, *Pleurotoma* (*Mangelia*) – Krauss, 1848: 109, pl. 6, fig. 11. 'In Bysso Pinnae squamiferae Sow., *Knysna*'. No contemporary material in SMNH.

Taxonomy: A synonym of *Anachis kraussii* (Sowerby, 1844) (Barnard 1959: 177). [Columbellidae]

gauritziana, *Cyrena* – Krauss ms. A manuscript name introduced in the synonymy of *Cyrena africana* var. *olivacea* (see below).

gibba, as variety of *Arca lactea* Linnaeus, 1758 [*sic*] – Krauss, 1848: 16. '...auf den Felsen-Terrassen der Natalküste...'. No contemporary material in SMNH, but there are two lots of Krauss material of his '*Arca lactea* L.' in the Senckenberg Museum which should be consulted (uncatalogued, Natal; SMF 315150/3 – *ab ora natalensi*, Bronn Coll'n).

Taxonomy: Treated as a synonym of *Arcopsis symnetrica* (Reeve, 1844) by Kilburn (1983: 545), but referred to *Striarca* Conrad, 1862, and considered a distinct species by Oliver (1985: 306). [Arcidae]

*****granulata***, as variety of *Achatina zebra* 'Lamk.' – Krauss, 1848: 80. 'In den Wäldern des Outiniqualandes im Distrikte George. In Natal, J. A. Wahlberg'. SMNH material: One specimen from Natal collected by Wahlberg labelled '*Achatina zebra*, possible type [of the variety]'. Type status: Not a type. This specimen is an example of the variable '*Achatina*' *zebra* (Bruguère, 1789) and does not match Krauss's description of his variety *granulata*. Specifically, the body whorl lacks the characteristic granular sculpture above the periphery. The Natal locality is almost certainly erroneous since the species is primarily an inhabitant of the southern and eastern Cape, with few records east of the East London area.

Taxonomy: Currently referred to *Archachatina* Albers, 1850 (van Bruggen 1965: 80) and type species (o.d.) of the subgenus *Tholachatina* Bequaert, 1950. *Achatina granulata* Krauss, 1848, is a senior primary homonym of *Achatina granulata* Pfeiffer, 1854¹. Following Pilsbry (1904: 79) and Bequaert (1950: 201) these two names should also be regarded as synonyms since they apply to the same species. Even though Krauss's *granulata* was proposed as a variety, there can be no doubt that the description and comparison provided constitute a valid proposal in terms of the ICZN code. Krauss's name thus has priority over that of Pfeiffer. [Achatinidae]

*****granulatus*, *Pleurobranchus*** – Krauss, 1848: 61. 'In sinu falso, J. A. Wahlberg'. SMNH material: Two specimens from False Bay, collected by Wahlberg (SMNH Type Coll'n 2308) and four specimens labelled 'Port Natal' (SMNH Type Coll'n 4981). Type status: Probable syntypes. SMNH 2308: since these specimens were almost certainly part of the original sample collected by Wahlberg, Krauss is cited as identifier in the old SMNH collection catalogue and he acknowledged receipt of alcohol-preserved material of this species from Stockholm (Table 1). We therefore consider these specimens probable syntypes. SMNH 4981: Krauss was also cited as identifier of this lot in the above-mentioned catalogue, but since the locality, though probably erroneous, is not the type locality, these specimens may only be considered possible syntypes.

Taxonomy: Treated as a synonym of *Berthellina citrina* (Rüppell & Leuckart, 1828) by Edmunds & Thompson (1972: 219). [Pleurobranchidae]

granulosa*, *Delphinula – Dunker in Krauss, 1848: 94, pl. 5, fig. 28. 'In tinu [*sic*] *tabulari*'. No contemporary material in SMNH. There is, however, original Dunker material of this species in the Humboldt University Museum, Berlin, labelled '*Cap d. g. Hoffnung*' (D. H., *pers. obs.*).

Taxonomy: A junior primary homonym of *Delphinula granulosa* Grateloup, 1828. Philippi (1852: 23) has proposed the replacement name *Delphinula dunkeri*. Type species of the liotine genus *Cynysca* Kilburn, 1970 (*nom. n.* for *Cynysca* H. & A. Adams, 1854, *non* Gray, 1844). [Turbinidae]

incarnata*, *Fissurella – Krauss, 1848: 65, pl. 4, fig. 7. 'In sinu *tabulari et falso, in litore natalensi*'. Although this name is included in the list of exchange material sent to Stockholm, no contemporary

¹ Volume 20 of the *Proceedings of the Zoological Society of London* was dated 1852, but the part containing Pfeiffer's paper was not published until 1854 (cf. Duncan 1937)

specimens could be located in SMNH. Lectotype (des. Janus 1961: 3, pl. 1, figs 4–6) and one paralectotype in Stuttgart Museum (MT 112 and MT 1120 respectively).

Taxonomy: A synonym of *Dendrofissurella scutellum hiantula* (Lamarck, 1822) (McLean & Kilburn 1986: 7). [Fissurellidae]

inflata, as variety of *Arca kraussii* Philippi (ms) – Krauss, 1848: 15. '*In litore natalensi prope Natalpoint*'. No contemporary material in SMNH.

Taxonomy: Not distinct from *Arca kraussii* Philippi in Krauss, 1848 (Barnard 1964: 369), itself a synonym of *A. avellana* Lamarck, 1819 (see below). [Arcidae]

****kynsnaensis**, *Litorina* – Krauss in Philippi, 1847 in 1842–50: 196, pl. 4, fig. 4; Krauss, 1848: 102. '*Caput Bonae Spei ad regionem fluminis Kynsna*' [Philippi]; '*An der Ausmündung des Kynsnaflusses im Distrikt George und wahrscheinlich an der ganzen östlichen Küste der Kolonie, nach Wahlberg auch an der Natalküste*' [Krauss]. SMNH material: 80 specimens collected by Krauss at '*ostium Kynsna*' (SMNH Type Coll'n 4403).

Type status: Paralectotypes. Lectotype (des. Janus 1961: 6, pl. 3, figs 5, 6) and 30 paralectotypes in Stuttgart Museum (MT108 and 1080–10829 respectively). These specimens were almost certainly part of the original sample collected by Krauss and may now legitimately be considered paralectotypes. The species is included in the list of duplicate material that Krauss sent to Stockholm (Table 1). Two additional *ex* Krauss lots are present in the Senckenberg Museum (uncatalogued, Kynsna Fluß; SMF 314706/7, Algoa Bay, Bronn Coll'n) and perhaps also in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: Traditionally regarded as a distinct species and placed in *Littorina* Férussac, 1822, (Rosewater 1970: 478; Kilburn & Rippey 1982: 50), but more recently Reid (1989: 99) has tentatively placed it in *Nodilittorina* (*Echinolittorina*) Habe, 1956, suggesting also that it might not be distinct from *Nodilittorina africana* (Krauss in Philippi, 1847) (see *africana*, *Littorina*). [Littorinidae]

kynsnaensis, *Paludina* – Krauss, 1848: 86, pl. 5, fig. 17. '*In fluviis Kynsna et Zoetendals-Valley*'. No contemporary material in SMNH. Connolly's discussion and illustration of the 'type' in Stuttgart Museum is sufficient to constitute a lectotype designation (Connolly 1939: 593, pl. 15, fig. 34, pl. 16, fig. 29), but this, plus the other shells in the type lot, must now be presumed lost. However, *ex* Krauss material is present in the Senckenberg Museum (SMF 301996/5, *Cap bon. spei*, Bronn Coll'n).

Taxonomy: A taxon of uncertain identity and in need of further study. Referred to *Assimineea* Fleming, 1828, by Connolly (1939: 593). [Assimineidae]

****kynsnaensis**, *Turritella* – Krauss, 1848: 106, pl. 6, fig. 9. '*In limo arenoso ad ostium flum. Kynsna*'. SMNH material: Many specimens with Krauss label stating *T. kynsnaensis* sp. n., but with a question mark added later and with the locality of 'Port Natal' (SMNH Type Coll'n 4947).

Type status: Syntypes. Since this species was listed amongst duplicate material sent to Stockholm (Table 1) and there is a Krauss label in the SMNH lot, the specimens may be considered syntypes. The species does not occur in KwaZulu-Natal and the 'Port Natal' locality must be erroneous. This is an example of the indiscriminate use of pre-printed 'Port Natal' labels for Wahlberg/Krauss material. Additional *ex* Krauss specimens are present in the Senckenberg Museum (SMF 314276/2, *Cap bon. spei*, Bronn Coll'n).

Taxonomy: A synonym of *Turritella capensis* Krauss, 1848, see above (Barnard, 1963a: 171). [Turritellidae]

***kochii**, *Phasianella* – Philippi in Krauss, 1848: 104, pl. 6, fig. 4. '*in litore capensi*'. No material in SMNH. A type with the locality '?S. Afr.' is present in BMNH (D. H., *pers. obs.*).

Taxonomy: A valid species of *Tricolia* Risso, 1826. This is the correct name for the large red *Tricolia* with turquoise spots below the suture, that commonly washes ashore in south-eastern Africa. Previously confused with *Tricolia capensis* (Dunker, 1846).

Philippi published a description of this species himself in the same year (Philippi 1848: 17). The month of publication of the part of the journal concerned was February, 1848, whilst Krauss himself gave the date of *Die südafrikanischen Mollusken* as January, 1848 (date cited at end of foreword) (see Krauss 1852: 34 under *Turbo natalensis*). Priority must thus lie with Krauss and the species be credited to 'Philippi in Krauss, 1848'. [Turbinidae]

kraussii, *Arca* – Philippi in Krauss, 1848: 14, pl. 1 fig. 13. '*In litore natalensi prope Natalpoint*'. No contemporary material in SMNH, but there are two lots of *ex* Krauss material in the Senckenberg Museum (uncatalogued, Natal; SMF 315103/2 – *ab ora natalensi*, Bronn Coll'n).

Taxonomy: A synonym of *Arca avellana* Lamarck, 1819 (Prashad 1932: 32). Philippi's own description of this species (in Philippi, 1842–50: vol. 3: 88, pl. 5, figs 8–10), which was virtually identical with that given by Krauss, was not published until 1849, and thus the description in *Die südafrikanischen Mollusken* was the first given for the taxon. [Arcidae]

kurrii, *Pupa* – Krauss in Pfeiffer, 1842 in 1841–46: 54; Krauss, 1848: 79. '*Promont. bon. spei.* (Krauss.)' [Pfeiffer]; '*Im südlichen Afrika, bei Zoetendals Valey [sic] im Distrikt Zwellendam der Capkolonie auf Pflanzen*' [locality as cited by Küster for his *P. ovularis*]. No contemporary material in SMNH. Taxonomy: Pfeiffer used Krauss's manuscript name, *kurrii*, as a replacement for *Pupa ovularis* Küster, 1841, presumably because he considered the latter a junior secondary homonym of *Pupa ovularis* (Olivier, 1801). Connolly disregarded this proposal because he considered Olivier's taxon to be a species of *Chondrula* Beck, 1837 (Connolly 1939: 379). However, following Article 59b of the ICZN code, the replaced junior homonym is permanently invalid and the species must be known by the substitute name. A species of *Fauxulus* Schaufuss, 1869 (Connolly 1939: 379). [Orculidae]

****küsteri**, *Auricula* – Krauss in Küster, 1843 in 1841–45: 34 [1844], pl. 4 [1843], figs 10–13; Krauss, 1848: 81. '*An der Natalküste in Südafrika*' [locality cited in Küster]. SMNH material: 11 specimens from 'Port N.' collected by Wahlberg, Krauss label present (SMNH Type Coll'n 4569).

Type status: Possible paralectotypes. Connolly's illustration of 'the type' in Stuttgart Museum (Connolly 1939: 469, pl. 15, fig. 24) constitutes a lectotype designation, but the specimen is presumed lost. Any extant types must be considered paralectotypes. Since there is a Krauss label with this SMNH material it must presumably have been sent to Krauss and subsequently returned to Stockholm, though the name is not included in the one available list of exchanged/returned material (Table 1). It cannot be proven whether Krauss examined this material before or after the publication of the description and thus the specimens can only be regarded as possible paralectotypes. We illustrate one closely resembling Küster's original figure (Fig. 12). Connolly (1939: 469) restricted the type locality to the mouth of the Umlaas River. There is a second lot of original material (three specimens) collected by Wahlberg at 'Port Natal' (SMNH), but these have no label in Krauss's handwriting and thus they cannot be considered types.

Taxonomy: Treated as a valid species of *Melampus* Montfort, 1810, by Connolly (1939: 469). The written description of this species was published one year after the illustration, but since the publication of a figure and name, prior to 1931, is considered to constitute a valid description (ICZN Art. 12(b)(7)), the date of this name is 1843. Following the ICZN code, Art. 32d(i), the spelling of this name must be corrected to *kuesteri*. [Ellobiidae]

lactea, *Chemnitzia* – Krauss, 1848: 88, pl. 5, fig. 23. '*In litore natalensi (in den Räumen von Galeolaria cespitosa)*'. No contemporary material in SMNH.

Taxonomy: A junior secondary homonym of *Turbo lacteus* Linnaeus, 1758, renamed *Turbonilla kraussi* by Clessin (1900: 135). [Pyramidellidae]

lactea, *Scalaria* – Krauss, 1848: 94, pl. 5, fig. 27. '*In litore natalensi*'. No contemporary material in SMNH.

Taxonomy: Considered a junior secondary homonym of *Turbo lacteus* Linnaeus, 1758, by Nyst (1871: 116) who proposed the replacement name *Scalaria kraussi*. Whether or not secondary homonymy is correct (and it evidently is not, since *Turbo lacteus* is now considered a species of *Turbonilla*), under Article 59b of the ICZN code the replacement name must be used (Kilburn 1985: 295). Currently known as *Epitonium (Hyaloscala) kraussi* (Nyst, 1871) (Kilburn 1985: 293). [Epitoniidae]

****linearis**, *Bulimus* – Krauss, 1848: 78, pl. 5, fig. 3. '*In monte Mohapaani ad flumen Limpopo; legit J. A. Wahlberg*'. SMNH material: One specimen collected by Wahlberg in the 'Mohapaani Mountains' (see note on localities), without a Krauss label (SMNH Type Coll'n 4949).

Type status: Possible paralectotype. Connolly's discussion of 'the type' in Stuttgart (Connolly 1939: 348), citing its dimensions, is sufficient to constitute a lectotype designation, but the specimen is now presumed lost. Although the SMNH specimen was clearly part of the original lot collected by Wahlberg, and Krauss acknowledged receipt of specimens in his list (Table 1), there is no proof that this actual specimen was examined by Krauss, and it can thus at best be considered a possible paralectotype.

Taxonomy: A valid species of *Opeas* Albers, 1850 (Connolly 1939: 348). [Subulinidae]

lineolata, as variety of *Siphonaria capensis* Quoy & Gaimard, 1833 – Krauss, 1848: 58, pl. 4, fig. 2. '*Auf den Felsenbänken der Tafelbai; ziemlich häufig*'. No contemporary material in SMNH.

Taxonomy: A junior homonym of *Siphonaria lineolata* Sowerby, 1835. A replacement name, *kraussi*, was proposed by Hubendick (1946: 33). Thought to be no more than a form of the variable *S. capensis* Quoy & Gaimard, 1833. [Siphonariidae]

****literatus**, *Chiton* – Krauss, 1848: 36, pl. 3, fig. 6. '*In litore natalensi*'. SMNH material: One specimen (a body with valves disarticulated) in alcohol collected by Wahlberg in Natal (SMNH Type Coll'n 4975). No Krauss label.

Type status: Probable syntype. Although there is no Krauss label with this specimen, the species was listed amongst the duplicate alcohol material sent/returned by Krauss to Stockholm and the specimen can

thus be considered a probable syntype. There may still be some extant types in the Stuttgart Museum (Janus 1961).

Taxonomy: A species of *Onithochiton* Gray, 1847 (Kaas & van Belle 1998: 112). [Chitonidae]

litoralis, *Tellina* – Krauss, 1848: 4, pl. 1, fig. 3. '*In litore natalensi et capensi, non rara*'. No contemporary material in SMNH.

Taxonomy: A species of *Macoma* Leach, 1819 (Barnard 1964: 545). [Tellinidae]

loveni, *Conus* – Krauss, 1848: 131, pl. 6, fig. 25. '*In litore capensi et natalensi*'. No contemporary material in SMNH.

Taxonomy: A synonym of *Conus tinianus* Hwass in Bruguière, 1792 (Kilburn 1971: 45). [Conidae]

****loveni**, *Helix* – Krauss, 1848: 76, pl. 4, fig. 21. '*In terra natalensi; legit J. A. Wahlberg*'. SMNH material: 14 specimens from 'Port Natal' collected by Wahlberg (SMNH Type Coll'n 2109). No Krauss label.

Type status: Probable syntypes. Connolly's discussion of the 'type in Stuttgart' is not sufficient to constitute a lectotype designation (Connolly 1939: 242). Since the species was listed by Krauss as being amongst duplicate material sent/returned to Stockholm (Table 1) the SMNH specimens may be considered probable syntypes. Any original Krauss labels are presumed lost.

Taxonomy: A species of *Trachycystis* s. s. Pilsbry, 1893 (Connolly 1939: 241). [Charopidae]

ludwigi, *Chiton* – Krauss, 1848: 38. This was a manuscript name which Krauss intended using for material that he subsequently realised was referable to *Chiton textilis* Gray, 1828. It was introduced in synonymy rather than as a new name and, since it has not been subsequently adopted, is unavailable (ICZN Art. 11(c)).

ludwigii, *Tellina* – Krauss, 1848: 3, pl. 1, fig. 2. '*In litore natalensi*'. No contemporary material in SMNH.

Taxonomy: A species of *Heterodonax* Mörch, 1853 (Boss 1969: 153). [Psammobiidae]

ludwigi, *Trochus* – Krauss, 1848: 99, pl. 5, fig. 33. '*In litore capensi*' [Baron v. Ludwig]. No contemporary material in SMNH. Exceptionally, Krauss stated that the material of this taxon was in the Stuttgart Museum, but it must now be presumed lost.

Taxonomy: Not distinct from *Gibbula benzi* Krauss, 1848 (Barnard 1963b: 276). [Trochidae]

major, as variety of *Tellina fabula* Gmelin, 1791 – Krauss, 1848: 3. '*In der Natalbai*'. No contemporary material in SMNH.

Taxonomy: Barnard (1964: 545) considered Krauss's '*Tellina fabula* Gmel.' to be based on the Indo-Pacific *Tellina dispar* Conrad, 1837, which has since been referred to *Macoma* Leach, 1819, subgenus *Scissulina* Dall, 1924 (Boss 1969: 150). The variety is evidently not distinct. [Tellinidae]

****meridionalis**, *Mytilus* – Krauss, 1848: 21, pl. 2, fig. 7. '*In sinu tabulari*'. SMNH material: One complete specimen from 'Tafel Bay' collected by Wahlberg (SMNH Type Coll'n 4501).

Type status: Syntype. This specimen (Figs 15–17) matches the measurements of the Wahlberg specimen given by Krauss and can be considered a syntype.

Taxonomy: A species of *Choromytilus* Soot-Ryen, 1952 (Barnard 1964: 390). [Mytilidae]

meruloides, *Trochus* – Krauss, 1848: 95. '*An der Natalküste*'. No contemporary material in SMNH.

Taxonomy: A new name proposed for juvenile specimens of *Trochus merula* Lamarck, 1822 [= *Oxysteles sinensis* (Gmelin, 1791), Barnard, 1963b: 267], which Krauss thought could be distinguished as a variety or perhaps a distinct species. The original locality cited was almost certainly erroneous since the species is not currently known east of the Bashee River, Transkei (D. H., pers. obs.). [Trochidae]

****microscopica**, *Helix* – Krauss, 1848: 76, pl. 4, fig. 20. '*Ad fluvium Mooi, Natal; legit J. A. Wahlberg*'.

SMNH material: Two specimens collected by Wahlberg with a Krauss label (Fig. 4) stating '*H. microscopica* Krauss n. sp. Moie Riviers Quelle, Natal. Zur Aufsicht v. Lovén' [source of Mooi River, Natal. For examination from Lovén], (SMNH Type Coll'n 2108).

Type status: Syntypes. Connolly referred to a Stockholm specimen measuring alt. 1.1 mm, lat. 1.3 mm as 'the type' and provided a figure of this (Connolly 1939: 224–5, pl. 7, figs 12–14). This represents a lectotype designation, but the two specimens in this lot are of the same size, both broken, and it is not possible to determine which is Connolly's 'type'. Connolly's drawing is a reconstruction, and does not obviously match one specimen more than the other. This lectotype designation must therefore be ignored and the specimens treated as syntypes. Connolly did not state his reasons for considering the SMNH material to be types, but it strongly suggests that there was none in Stuttgart. The species was listed amongst material that Krauss acknowledged receiving from Stockholm (Table 1) and was evidently returned subsequently.

Taxonomy: Tentatively referred to *Trachycystis* Pilsbry, 1893, by Connolly (1939: 224), but in need of further study. Could also be a juvenile of a species of *Nesopupa* Pilsbry, 1900 or *Pupilla* Leach in Fleming, 1828. The better of the two syntypes is illustrated (Figs 21–23). [?Charopidae]

*****miniata***, as variety of *Pupa pfeifferi* Krauss in Küster, 1844 (in 1841–55) – Krauss, 1848: 79. '*Ad montem Mohapaani legit J. A. Wahlberg*'. SMNH material: Four specimens from '*Mohapaani, in truncus putridis*', collected by Wahlberg, no Krauss label (SMNH Type Coll'n 4951 and 4952).

Type status: Lectotype and paralectotypes. Connolly (1932: 72, pl. 3, fig. 1) discussed the 'original pair' of this species in Stockholm and figured one as 'the type'. This can be recognised amongst the four SMNH specimens on account of the particularly bright red colour of the dried body and its slightly damaged parietal lamella (SMNH 4951, Fig. 13), a feature reproduced also in Connolly's figure. It is fractionally longer than indicated by Connolly (5.6 mm compared with 5.3 mm). In error Connolly later stated that the type was in Stuttgart Museum (Connolly 1939: 31). Although the four SMNH specimens were obviously part of the original lot collected by Wahlberg (two of which were sent to Connolly on loan), there is nothing to indicate whether or not Krauss had seen them himself and Connolly's reasons for considering one to be 'the type' are not clear (there is no Krauss label and the variety was not mentioned in Krauss's list of received/exchanged material, Table 1). However, in the absence of extant Stuttgart material, there seems little point in questioning Connolly's lectotype designation.

Taxonomy: Belongs to *Gulella* Pfeiffer, 1856, and now recognized as a distinct species (Connolly 1932: 72). [Streptaxidae]

multicolor, *Trochus* – Krauss, 1848: 97, pl. 5, fig. 31. '*In sinu tabulari. E collectione cl. Benz*'. No contemporary material in SMNH.

Taxonomy: A species of *Gibbula* Risso, 1826 (Barnard, 1963b: 274). [Trochidae]

natalense, *Buccinum* – Krauss, 1848: 121, pl. 6, fig. 16. '*In litore natalensi*'. No contemporary material in SMNH.

Taxonomy: A species of *Bullia* Gray in Griffith & Pigeon, 1834 (Barnard 1959: 134). [Nassariidae]

natalense, *Cardium* – Krauss, 1848: 12, pl. 1, fig. 9. '*In litore natalensi, rara*'. No contemporary material in SMNH.

Taxonomy: Referable to *Fulvia* Gray 1853, and traditionally treated as a synonym of *F. papyracea* (Bruguère, 1879) (e.g. Barnard 1964: 494), but recently regarded as a distinct species (Vidal 1994: 104). [Cardiidae]

*****natalensis***, *Arca* – Krauss, 1848: 17, pl. 1, fig. 12. '*Prope Natalpoint; rara*'. SMNH material: Two complete specimens and one free valve with an original Wahlberg label giving the locality 'Port Nat.' collected by Wahlberg in 1839 (SMNH Type Coll'n 4498). The words '*Arca natalensis* Kr.' are written in Krauss's handwriting on the reverse of the label (Fig. 6).

Type status: Probable syntypes. Wahlberg was not cited as collector in the original description and there is no mention of this taxon in the list of received/exchanged material (Table 1). However, since the specimens were identified by Krauss himself, perhaps prior to 1848, they are probably syntypes.

Taxonomy: A species of *Anadara* (*Scapharca*) Gray, 1847 (Kilburn 1983: 536). [Arcidae]

****natalensis***, *Bulimus* – Krauss in Pfeiffer, 1846 in 1841–46: 86; Krauss, 1848: 78, pl. 5, fig. 1. '*Port Natal. (Krauss)*' [Pfeiffer]; '*In sylvis prope Natalbai. In monte Drackenberg, J. A. Wahlberg*' [Krauss]. SMNH material: One lot with an original Wahlberg label (Fig. 2) stating '*Helix* No 3. *norr om Maskalis Berg* [north of Magaliesberg]'.

Type status: Not types. Connolly's discussion of the type material in the Stuttgart Museum is not sufficient to constitute a lectotype designation (Connolly 1939: 423) and any extant types must be considered syntypes. Although Krauss acknowledged receipt of material under this name (Table 1) and the SMNH specimens were collected by Wahlberg, they are from a locality (Magaliesberg, west of Pretoria) not mentioned by either Pfeiffer or Krauss and cannot be considered types. Connolly indicated that the material in Stuttgart Museum comprised two, perhaps three, species. Since it is also evident that the descriptions in Pfeiffer (1846) and Krauss (1848) were composite, there is a need to designate a neotype to fix the identity of this taxon. That the SMNH specimens are even conspecific with the species currently accepted to be *natalensis* has not been established. According to Zilch (1985: 237), there are additional '*ex Krauss*' syntypes in the Senckenberg Museum (SMF 238756/3). These need to be examined before the issue is taken further.

Taxonomy: A species of *Edouardia* Gude, 1914 (Connolly 1939: 422). [Cerastidae]

natalensis, *Bulla* – Krauss, 1848: 71, pl. 4, fig. 14. '*In litore natalensi*'. SMNH material: Two specimens labelled '*Bay Falso*', collected by Wahlberg. No Krauss label.

Type status: Not types. Wahlberg was not cited as collector in the original description and the specimens are not from the type locality. In the absence of evidence suggesting otherwise, they cannot be considered types.
 Taxonomy: A species of *Haminoea* Turton & Kingston in Carrington, 1830, but in need of further study (Kilburn & Rippey 1982: 132). Treated as valid by Gosliner (1987: 44). [Haminoeidae]

****natalensis**, *Doris* – Krauss, 1848: 35. '*In litore natalensi*'; J. A. Wahlberg'. SMNH material: One specimen (in alcohol) with Krauss label, from Natal, collected by Wahlberg (SMNH Type Coll'n 4980).

Type status: Holotype. The original description indicated that there was only one specimen available and this specimen must thus be considered the holotype.

Taxonomy: This species was not discussed by Bergh (1907) in his revision of South African opisthobranchs and its identity remains unclear. Gosliner (1987: 19) treated it as a species *incertae sedis*.

***natalensis**, *Fissurella* – Krauss, 1848: 66, pl. 4, fig. 8. '*In litore natalensi*; *satis frequens*'. No contemporary material in SMNH. Lectotype (des. Janus 1961: 3, pl. 1, figs 7–9) and five paralectotypes in Stuttgart Museum (MT 113 and MT 1130–4 respectively). Additional *ex* Krauss material in SMF 313812/1 – 'Port Natal', Bronn Coll'n).

Taxonomy: A valid species of *Fissurella* Bruguière, 1798 (Barnard 1963b: 286). [Fissurellidae]

****natalensis**, *Limnaeus* – Krauss, 1848: 85, pl. 5, fig. 15. '*In stagnis natalensibus*; *frequens*'. SMNH material: Two lots with 11 and 21 specimens respectively, with 'Port Natal... Wahlberg' labels (SMNH Type Coll'n 4957 and 4958). There are additional specimens (same data), without shells, preserved in alcohol (SMNH Type Coll'n 4950). No Krauss labels.

Type status: Probable syntypes. Connolly's mention of 'the type' in Stuttgart Museum (Connolly 1939: 478) is not sufficient to constitute a lectotype designation and thus any additional types must be considered syntypic. Although Wahlberg was not cited as collector and there are no Krauss labels remaining with the SMNH specimens, the species is included in the list of duplicate material that Krauss sent to Stockholm (under the name *Limnaea* [sic] *succinea* Desh., a name which he acknowledged using prior to describing it as a new species). They may be considered probable syntypes. There is an old exhibition label present indicating that the specimens had at one time been on display and thus the original labels may well have been lost. There may be additional material in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: A species of *Limnaea* Lamarck, 1799 (Brown 1994: 156). [Lymnaeidae]

****natalensis**, *Litorina* – Krauss in Philippi, 1847 in 1842–50: 160, pl. 3, fig. 4; Krauss, 1848: 102. '*Ora Natal in Africa australis*' [Philippi]; '*An den Felsen der Algoabai und Natalküste*' [Krauss]. SMNH material: 17 specimens with a 'Port Natal – Wahlberg' exhibit label (SMNH Type Coll'n 4971). No Krauss label.

Type status: Probable paralectotypes. Lectotype (des. Janus 1961: 7, pl. 3, figs 7, 8) and 13 paralectotypes in Stuttgart Museum (MT109 and 1090–10912 respectively). Since this species was listed amongst the duplicate material sent to Stockholm by Krauss (Table 1), the SMNH specimens may be considered probable paralectotypes. Wahlberg was not mentioned as the original collector and the presence of a 'Port Natal – Wahlberg' label with this lot is almost certainly another example of the indiscriminate use of such labels in the past. Any original Krauss labels are presumed lost. Two additional *ex* Krauss lots are present in the Senckenberg Museum (uncatalogued, Natal; SMF 314625/5, *ex ora natalensi*, Bronn Coll'n) and perhaps also in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: A species of *Nodilittorina* s. s. Martens, 1897 (Reid 1989: 100). [Littorinidae]

***natalensis**, *Patella* – Krauss, 1848: 53, pl. 3, fig. 10. '*In scopulis litoris natalensis*, *non frequens*'. No contemporary material in SMNH.

Taxonomy: Treated for many years as a synonym of *Patella granularis* Linnaeus, 1758 (e.g. Koch 1949: 503), but recently shown to be a cryptic sibling of that species, occurring in KwaZulu-Natal and the north-eastern Cape (Transkei), that merits recognition as a distinct species (T.M. Ridgway *et al.* 1998). Ridgway, Branch & Stewart (1999) have subsequently provided a redescription and designated a neotype (South African Museum A54196). Referable to *Scutellastra* H. & A. Adams, 1854, which is now considered to be generically distinct from *Patella* (S. A. Ridgway *et al.* 1998). [Patellidae]

****natalensis**, *Physa* – Krauss in Küster, 1841: 8, pl. 1, figs 12–14, in Küster, Dunker & Clessin 1841–86; Krauss, 1848: 84, pl. 5, fig. 10. '*In Bächen des Umgani-Valley, an der Natalküste in südöstlichen Afrika*' [Küster]; '*in stagnis natalensibus*' [Krauss]. SMNH material: 45 specimens from 'Port Natal' collected by Wahlberg (SMNH Type Coll'n 4972). No Krauss label.

Type status: Probable syntypes. Connolly's simple statement 'type of *natalensis* in Stuttgart' is not sufficient to constitute a lectotype designation (Connolly 1939: 498) and any extant types must be

considered syntypes. Since Krauss generally seems to have retained the original material of 'Krauss in Küster' taxa and the species was listed amongst the duplicate material that he sent to Stockholm (Table 1), the SMNH specimens may be considered probable syntypes, even though there is no Krauss label with them. There is additional syntype material in BMNH (Connolly 1939, pl. 16, fig. 20 'paratype'). Taxonomy: A species of *Bulinus* Müller, 1781 (Brown 1994: 224). [Planorbidae]

natalensis, *Planorbis* – Krauss, 1848: 83, pl. 5, fig. 9. '*In Umgani* [Umgeni]-Valley, Natal'. No contemporary material in SMNH. Connolly's mention of 'the type' in Stuttgart Museum (Connolly 1939: 491) is not sufficient to constitute a lectotype designation. There may be original material in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: A species of *Ceratophallus* Brown & Mandahl-Barth, 1973 (Brown 1994: 180). [Planorbidae]

***natalensis**, *Siphonaria* – Krauss, 1848: 61, pl. 4, fig. 6. '*In litore natalensi*'. No contemporary material in SMNH. Lectotype (des. Janus 1961: 9, pl. 4, figs 4–6) and two paralectotypes in Stuttgart Museum (MT 123 and MT 1230–1 respectively).

Taxonomy: Maintained as a valid species by Hubendick (1946: 59), but subsequently considered a synonym of *Siphonaria aspera* Krauss, 1848 (Allanson 1959: 169) [= *Siphonaria serrata* (Fischer, 1807) see above]. [Siphonariidae]

***natalensis**, *Tellina* – Krauss in Philippi, 1846 in 1842–50: 91, pl. 4, fig. 4; Krauss, 1848: 3. No locality given by Philippi; '*In litore natalensi*' [Krauss]. No contemporary material in SMNH.

Taxonomy: A species of *Tellina* Linnaeus, 1758 (Boss 1969: 131), but see also discussion in Kilburn & Rippey (1982: 217). [Tellinidae]

****natalensis**, *Turbo* – Krauss, 1848: 101, pl. 6, fig. 1. '*In litore natalensi*'. SMNH material: Six specimens from 'Port Natal' collected by Wahlberg with a Krauss label (SMNH Type Coll'n 4953). Type status: Syntypes. Since this species was listed amongst duplicate material that Krauss sent to Stockholm (Table 1) and the SMNH lot has an original Krauss label, the specimens may be considered syntypes. Krauss did not cite Wahlberg as having collected this species and the 'Port Natal ... Wahlberg' label currently with the specimens was probably used in error.

Taxonomy: Now regarded as an eastern subspecies of *Turbo cidaris* Gmelin, 1791 (Kilburn & Rippey 1982: 47). By coincidence, Reeve, in the same month of the same year (January, 1848), named Wahlberg material of this species in the Cuming collection as *Turbo natalensis*. Following Barnard (1963b: 213), we credit the name to Krauss. There are four syntypes of *Turbo natalensis* Reeve, 1848, in BMNH (1968144), from 'Port Natal' collected by Wahlberg. [Turbinidae]

natalensis, *Unio* – Krauss, ms. See *caffer*, *Unio*.

natalensis, *Vaginulus* – [v. Rapp.] Krauss, 1848: 72. '*In terra natalensi*'. No contemporary material in SMNH. Connolly's simple statement that the type was in Stuttgart Museum does not constitute a lectotype designation (Connolly 1939: 450), but the original description suggests that there was only one specimen available and thus this was the holotype. It is now presumed lost.

Taxonomy: A species of *Laevicaulis* Simroth, 1913 (Herbert 1997: 204). Krauss credited this name to 'v. Rapp.', but his reasons for doing so are not evident and the name has since then almost invariably been credited to Krauss himself. W. L. von Rapp was an early German collector. [Veronicellidae]

****natalensis**, *Vitrina* – Krauss, 1848: 74, pl. 4, fig. 17. '*In terra natalensi (Auf Pflanzen in der Nähe der Natalbai)*'. SMNH material: Two lots, both with six specimens each, from 'Port Natal' collected by Wahlberg and with a Krauss label (SMNH Type Coll'n 4559 and 4560). There are additional specimens with the same data (four with shell and nine without) in alcohol (SMNH Type Coll'n 4973).

Type status: Syntypes. Connolly's mention of 'the type' in Stuttgart Museum (Connolly 1939: 133) is not sufficient to constitute a lectotype designation and thus any additional types must be considered syntypes. Wahlberg was not mentioned as collector in the original description, but the presence of a Krauss label and the fact that the species was listed amongst the duplicate material that Krauss sent to Stockholm, justifies considering the SMNH material as syntypes. The 'Port Natal ... Wahlberg' label currently with the specimens was probably used in error.

Taxonomy: A species of *Sheldonia* Ancey, 1888, and secondarily homonymous with *Sheldonia natalensis* (Pfeiffer, 1846). Currently known by its junior synonym *Sheldonia subcornea* (Preston, 1909) (Connolly 1939: 133). [Urocyclidae]

nigra, *Rissoa* – Krauss, 1848: 86, pl. 5, fig. 19. '*In sinu Algoënsi et tabulari*'. No contemporary material in SMNH, but *ex* Krauss material is present in the Senckenberg Museum (SMF 304980/6, 'Port

Natal', Bronn Coll'n), the Humboldt University Museum, Berlin (Ponder & Yoo 1977: 641) and perhaps also in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: A species of *Eatoniella* Dall, 1876 (Ponder & Yoo 1977: 641) and a junior secondary homonym of *Paludestrina nigra* d'Orbigny, 1840 [= *Eatoniella*] from South America. A replacement name, *Eatoniella afronigra*, has been proposed by Ponder & Worsfold (1994: 15). [Eatoniellidae]

obliquus, *Ancylus* [non Broderip & Sowerby, 1832] – Krauss, ms. See *caffer*, *Ancylus*.

**oblecta*, *Patella* – Krauss, 1848: 47, pl. 3, fig. 11. '*In sinu tabulari*'. No contemporary material in SMNH. Neotype (des. Robson 1986: 315, figs 20–22) in Natal Museum (NMSA D2159/T329). The original 'Table Bay' locality was erroneous (no subsequent records west of Transkei) and Robson (1986: 313) emended the type locality to Hibberdene, KwaZulu-Natal, the locality at which the neotype was collected.

Taxonomy: A valid species (cf. Robson 1986: 313), now referred to *Scutellastra* H. & A. Adams, 1854 (S. A. Ridgway *et al.* 1998). [Patellidae]

**oculus*, *Siphonaria* – Krauss, 1848: 58, pl. 4, fig. 3. '*In sinu tabulari*'. No contemporary material in SMNH. Lectotype (des. Janus 1961: 9, pl. 4, figs 7–9) in Stuttgart Museum (MT 124 and MT 1240–3 respectively).

Taxonomy: A valid species of *Siphonaria* Sowerby, 1823 (Chambers & McQuaid, 1994: 265). [Siphonariidae]

**olivacea*, as variety of *Cyrena africana* Krauss, 1848 – Krauss, 1848: 8. '*In flumine Gauritz, provincia Zwelendani*'. (Krauss); *in flumine Lepenula*, (Wahlberg); *in parte superiore fluminis Nili*, (Parreyss). SMNH material: 21 complete specimens collected by Wahlberg from '*fluss Lepenula*' (SMNH Type Coll'n 4506), with a Krauss label.

Type status: Syntypes. These specimens are obviously part of the original lot collected by Wahlberg and since there is a Krauss label present, they may be considered syntypes. The species was included (as '*Cyrena gauritziana*' = earlier ms name for *olivacea*) in the list of duplicate material sent/returned by Krauss to Stockholm (Table 1). There is additional *ex* Krauss material in the Senckenberg Museum labelled as *Cyrena gauritziana* (uncatalogued, *Gauritz Fluß*; SMF 315417/2 – *e colonia capensi*, Bronn Coll'n).

Taxonomy: Krauss evidently gave this varietal name to what he considered to be the typical form of his *Cyrena africana* (see above) and it is now treated as a synonym thereof (Mandahl-Barth 1988: 114, Daget 1998: 168). [Corbiculidae]

**oniscus*, *Chiton* – Krauss, 1848: 39, pl. 3, fig. 4. '*In litore natalensi, legit J. A. Wahlberg*'. SMNH material: 23 specimens (two disarticulated) from 'Port Natal' collected by Wahlberg (SMNH Type Coll'n 4954). No Krauss label.

Type status: Possible syntypes. Although this species was listed amongst the alcohol material received by Krauss from Stockholm, there is no Krauss label with the SMNH lot and thus no proof that he returned the specimens sent, after examination. The existing SMNH material, though almost certainly part of the original sample collected by Wahlberg, can thus at best be considered possible syntypes. The majority are pale with few, relatively coarse ridges on the girdle scales and are specimens of what is now called *Ischnochiton bergoti* (Vélain, 1877). Approximately three specimens (damaged) represent 'true' *oniscus* and have more numerous, very fine threads on the girdle scales. There may still be some extant types in Stuttgart Museum (Janus 1961).

Taxonomy: A species of *Ischnochiton* Gray, 1847 (Kaas & van Belle 1998: 135). [Ischnochitonidae]

ovata, *Paludina* – Krauss, 1848: 85, pl. 5, fig. 16. '*In fluviis Knysna et Zoetendals-Valley*'. No contemporary material in SMNH. Connolly's mention of 'the type' in Stuttgart (Connolly 1939: 589) is not sufficient to constitute a lectotype designation. The specimen he illustrated (pl. 15, fig. 37) and for which he gave dimensions was called a 'paratype', must be considered a syntype. Both specimens are now presumed lost.

Taxonomy: A species of *Assiminea* Fleming, 1828 (Connolly 1939: 589). [Assimineidae]

**pfeifferi*, *Planorbis* – Krauss, 1848: 83, pl. 5, fig. 7. '*In Umgani [Umgeni] -Valley, Natal*'. SMNH material: Two lots with many specimens, both from 'Port Natal' collected by Wahlberg, both with Krauss labels (SMNH Type Coll'n 4955 and 4956).

Type status: Syntypes. Connolly's statement 'type of *pfeifferi* in Stuttgart' is not sufficient to constitute a lectotype designation (Connolly 1939: 486). Since there are Krauss labels with these SMNH lots, the specimens may be considered syntypes. Wahlberg was not cited as the collector in the original description and the 'Port Natal ... Wahlberg' labels currently with the specimens were probably used in

error. The species was not included in the one available list of received/exchanged material (Table 1), indicating that there must have been other similar exchanges for which there is now no documentation.

Taxonomy: A species of *Biomphalaria* Preston, 1910 (Brown 1994: 195). [Planorbidae]

pfeifferi, *Pupa* – Krauss in Küster, 1844 in 1841–55: 87, pl. 12, figs 17–19; Krauss, 1848: 79. ‘*In der Zoetendals Valley im Distrikt Zwellendam der Capcolonie*’ [Küster]; ‘*Ad montem Potteberg, Zwellendam*’ [Krauss]. SMNH material: One specimen, without a Krauss label. One label present states ‘Potteberg Mt. Zwellendam’, but this appears to have been added latter by Connolly – the old catalogue entry states only ‘*Pupa.....Lokal? Wahlberg 1845*’. There is another medium-age museum label, prepared by Odhner with data as per the catalogue in ink, but with ‘Potteberg Mt. Zwellendam’ added in pencil.

Type status: Not type. Connolly’s discussion and illustration of ‘the type’ in Stuttgart Museum (Connolly 1939: 44, pl. 1, fig. 10), citing its dimensions, constitutes a lectotype designation, but the specimen is now presumed lost. Any remaining types must be considered paralectotypes. In 1932, Connolly figured a specimen that Odhner had sent him from Stockholm as a ‘paratype’ (Connolly 1932: 72, pl. 4, fig. 2). This is the specimen mentioned above (alt. 4.7 mm), but Connolly’s grounds for considering it a type are not clear. Since neither Küster nor Krauss cited any Wahlberg-collected material in their discussions of this taxon and since the Wahlberg material originally had no locality, its type status must be dubious. Furthermore, Connolly indicated that the specimen concerned is ‘not quite normal’ for *G. pfeifferi*. In view of the above we do not consider it appropriate to afford this specimen type status, even though the name was listed amongst the duplicate material that Krauss sent to Stockholm (Table 1). A preferable course of action for a reviser would be to designate a neotype from morphologically typical, topotypic material.

Taxonomy: A species of *Gulella* Pfeiffer, 1856 (Connolly 1939: 43). Connolly dated the description of this species as 1841. However, Smith & England (1937: 92) indicated the plate concerned was published in 1844 and the description in 1845. Since, prior to 1931, the publication of a figure and name constitutes a valid description (ICZN Art. 12(b)(7)), the date of this name must be given as 1844. [Streptaxidae]

****pinguis**, *Helix* – Krauss, 1848: 75, pl. 4, fig. 19. ‘*In terra natalensi; legit J. A. Wahlberg*’. SMNH material: Five specimens from ‘Port Natal’ collected by Wahlberg (SMNH Type Coll’n 2106). No Krauss labels.

Type status: Probable paralectotypes. Connolly’s discussion of ‘the type’ in Stuttgart (Connolly 1939: 151, pl. 2, figs 12–14), citing its dimensions and providing a figure, is sufficient to constitute a lectotype designation, but the specimen is presumed lost. Since the SMNH specimens were almost certainly part of the original lot collected by Wahlberg, and the species was listed amongst duplicate material sent/returned by Krauss (Table 1) to Stockholm, they may be considered probable paralectotypes. Any Krauss labels are presumed lost.

Taxonomy: A species of *Gudeella* Preston, 1913 (Connolly 1939: 151). [Urocyclidae]

pinnae, *Rissoa* – Krauss, 1848: 87, pl. 5, fig. 21. ‘*In bysso Pinnae squamiferae G. B. Sow.*’ No contemporary material in SMNH, but some *ex* Krauss specimens are present in the Senckenberg Museum (SMF 304946/2, *Cap bon. spei*, Bronn Coll’n) and perhaps also in the Leiden Museum (van Bruggen 1992: 83).

Taxonomy: A species of *Alaba* H. & A. Adams, 1853 (Kilburn & Rippey 1982: 54). [Litiopidae]

pottebergensis, *Pupa* – Krauss in Küster, 1841 in 1841–55: 17, pl. 2, figs 20–22; Krauss, 1848: 79. ‘*Auf Pflanzen am Berge Potteberg, Distrikt Zwellendam in der Capcolonie*’ [Küster]; ‘*Auf Pflanzen am Potteberg im Distrikt Zwellendam; selten*’ [Krauss]. No contemporary material in SMNH. Connolly’s discussion of ‘the type’ in Stuttgart Museum (Connolly 1939: 378), citing its dimensions, is sufficient to constitute a lectotype designation, but the specimen is now presumed lost.

Taxonomy: A variety of *Fauxulus capensis* (Küster, 1841) (Connolly 1939: 378). [Orculidae]

****pruinosa**, *Patella* – Krauss, 1848: 56, pl. 3, fig. 9 a & b. ‘*In sinu tabulari*’. SMNH material: 13 specimens collected by Wahlberg, with an old exhibit label stating ‘Port Natal’ (SMNH Type Coll’n 4962); six additional specimens with the same data in alcohol (SMNH Type Coll’n 4982). No Krauss labels.

Type status: Possible syntypes. Krauss stated that Wahlberg had specimens from False Bay and since the species does not occur in Durban, it is evident that the SMNH material has subsequently been mislocalised. However, there is nothing to suggest that these specimens were examined by Krauss and they can at best be considered possible syntypes. Additional *ex* Krauss material is present in the Senckenberg Museum (SMF 313965/4, *Cap bon. spei*, Bronn Coll’n) and perhaps also in the Leiden Museum (van Bruggen 1992: 83). These specimens may prove to have greater legitimacy as types.

Taxonomy: A species of *Helcion* Montfort, 1810 (S. A. Ridgway *et al.* 1998). [Patellidae]

punctulata, as variety of *Chiton textilis* Gray, 1828 – Krauss, 1848: 39. No locality specified. No contemporary material in SMNH; some may remain in Stuttgart Museum (Janus 1961).
Taxonomy: Not distinct from *Ischnochiton textilis* (Gray, 1828) (Kaas & van Belle 1990: 117). [Ischnochitonidae]

****pustulatus**, *Chiton* – Krauss, 1848: 42, pl. 3, fig. 7. '*In litore natalensi*, J. A. Wahlberg'. SMNH material: One specimen from 'Port Natal' collected by Wahlberg (SMNH Type Coll'n 4983). No Krauss label.

Type status: Possible syntype. Although this species was listed amongst the alcohol material received by Krauss from Stockholm, there is no Krauss label with the SMNH lot, and thus no proof that he returned the specimens sent, after examination. The existing SMNH specimen, though almost certainly part of the original sample collected by Wahlberg, can thus at best be considered a possible syntype. There may be additional extant types in the Stuttgart Museum (Janus 1961).

Taxonomy: A synonym of *Chaetopleura pertusa* (Reeve, 1847) (Kaas & van Belle 1987: 85). [Ischnochitonidae]

radiata, as variety of *Patella variabilis* Krauss, 1848 – Krauss, 1848: 55, pl. 3, fig. 12c. '*In litore natalensi*'. No contemporary material in SMNH.

Taxonomy: A homonym of *Patella radiata* Born, 1778. The only non-homonymous name that Krauss proposed for this species was var. *concolor* Krauss, 1848 (see above). [Patellidae]

****rivularis**, *Helix* – Krauss, 1848: 77, pl. 4, fig. 25. '*Ad fontem fluvii Mooi, Natal; legit J. A. Wahlberg*'. SMNH material: One specimen from the sources of the '*Mooie Riviers*' collected by Wahlberg (SMNH Type Coll'n 2110).

Type status: Holotype. This specimen appears to have been the only one available (Connolly 1939: 209, pl. 9, figs 11–12).

Taxonomy: A species of *Trachycystis* Pilsbry, 1893 (Connolly 1939: 208). Connolly indicated that this was a troublesome taxon, which he had not been able to match. We therefore provide a photograph of the holotype (Figs 24–26). [Charopidae]

schoeteri, *Patella* – Krauss, 1848: 43. '*In litore prope Elim* [from a missionary] *et in sinu Saldanha* [from Wahlberg]'. SMNH material: There are some specimens labelled *Patella oculus* collected by Wahlberg in False Bay, but nothing identified as *P. schoeteri* from Saldanha Bay.

Taxonomy: A junior synonym of *Patella oculus* Born, 1778 (Koch 1949: 507). Traditionally referred to *Patella* subgenus *Cymbula* H. & A. Adams, 1854, but *Cymbula* recently shown to be generically distinct (S. A. Ridgway *et al.* 1998). [Patellidae]

****semistriatus**, as variety of *Mytilus variabilis* Krauss, 1848 – Krauss, 1848: 25, pl. 2, fig. 6. '*An der Natalküste*'. SMNH material: Two lots, both from 'Port Natal' collected by Wahlberg, with Krauss identification labels (Fig. 5) (SMNH Type Coll'n 4502 (63 specimens) and 4503 (15 specimens)). Lot 4502 also has an original Wahlberg label stating '*Mytilus*, No 69, 104 expl [specimens], Port Natal, Wlbg. 1839'.

Type status: Syntypes. Although Wahlberg was not cited as collector in the original description and the species was not included in the list of received/exchanged material (Table 1), the presence of Krauss identification labels indicates that the material was examined by him. Erring on the side of pragmatism, we consider these specimens to be syntypes.

Taxonomy: A species of *Brachidontes* Swainson, 1840 (Barnard 1964: 395). Although recent authors have continued to use the name *Brachidontes variabilis* (Krauss, 1848), for this taxon (Oliver 1992: 48), Kilburn & Rippey (1982: 159) have shown that *Mytilus variabilis* Krauss, 1848, is a junior primary homonym (see *variabilis*, *Mytilus* below), and used Krauss's varietal name *semistriatus* for the taxon. However, it is evident that this is also a junior homonym (cf. *Mytilus semistriatus* d'Orbigny, 1844), but we refrain from proposing a replacement at this stage, since the limits of the existing nominal taxa in this group are not well established and a valid name may already exist.

Both Barnard (1964: 397) and Davies (1980: 226) have called for a re-examination of the original material of this species, the latter author suggesting that the variety might in reality represent *Musculus virgiliae* Barnard, 1964. The present specimens, however, lack distinct denticles on the inner anterior margins of the valves (present in *M. virgiliae*) and are typical of the rather weakly sculptured form of '*variabilis*' found in more exposed sites (Figs 18–20).

spuria, *Aplysia* – Krauss, 1848: 71. '*An der Natalküste*'. No contemporary material in SMNH.

Taxonomy: A possible synonym of *Aplysia parvula* Mörch, 1863 (Barnard 1974: 730). [Aplysiidae]

striata, *Succinea* – Krauss, 1848: 73, pl. 4, fig. 16. '*In flumine Limpopo; legit J. A. Wahlberg*'. SMNH

material: 22 specimens from Limpopo River collected by Wahlberg. No Krauss label.

Type status: Not types. Connolly's discussion and figure of 'the type' in Stuttgart (Connolly 1939: 442, pl. 15, fig. 3) is sufficient to constitute a lectotype designation, but the specimen is now presumed lost. Although the SMNH specimens were almost certainly part of the original lot collected by Wahlberg, the species was not included in the list of received/exchanged material (Table 1) and there is thus no direct evidence suggesting they had been examined by Krauss. They can at best be considered contemporary topotypes.

Taxonomy: A species of *Succinea* Draparnaud, 1801 (Connolly 1939: 441). [Succineidae]

subcostata, as variety of *Buccinum rubiginosum* Reeve, 1846 – Krauss, 1848: 120. '*In litore natalense*'.

No contemporary material in SMNH.

Taxonomy: Distinct from *B. rubiginosum* and an earlier name for *Buccinum cariniferum* Küster, 1858. Belongs within *Cantharus* Röding, 1798 (Kilburn & Rippey 1982: 94). [Buccinidae]

subquadrata, as variety of *Cytherea hepatica* Lamarck, 1818 – Krauss, 1848: 10. '*...leben im Brackwasser und im Schlamme des Knysnaflusses, nahe an seiner Ausmündung*'. No contemporary material in SMNH.

Taxonomy: An interesting form of *Dosinia hepatica* (Lamarck, 1818) which requires further study (Kilburn & Rippey 1982: 193). [Veneridae]

tabularis, *Patella* – Krauss, 1848: 47 pl. 3, fig. 8. '*In sinu tabulari*'. No contemporary material in SMNH.

Taxonomy: A valid species, traditionally referred to *Patella* subgenus *Scutellastra* H. & A. Adams, 1854, but *Scutellastra* was recently shown to be generically distinct (S. A. Ridgway *et al.* 1998). [Patellidae]

****tabularis**, *Trochus* – Krauss, 1848: 97, pl. 5, fig. 30. '*In sinu tabulari*'. SMNH material: Nine specimens from '*Tafelbai*' collected by Wahlberg with an original Krauss label (SMNH Type Coll'n 4961).

Type status: Syntypes. Since these specimens came from the type locality and were identified by Krauss, they may be considered syntypes. Two additional *ex* Krauss lots are present in the Senckenberg Museum (uncatalogued, *Tafelbai*; SMF 314147/2, 'Port Natal', Bronn Coll'n).

Taxonomy: A species of *Oxystele* Philippi, 1847 (Barnard 1963b: 269). The type locality is almost certainly erroneous as the species seldom occurs west of Port Alfred. [Trochidae]

****tigrinus**, *Chiton* – Krauss, 1848: 38, pl. 3, fig. 5. '*In sinu falso*; Wahlberg'. SMNH material: One lot of dry specimens (one disarticulated), with a pre-printed 'Port Natal...Wahlberg' label (SMNH Type Coll'n 4961, seven specimens); two further lots in alcohol, one labelled '*Sinu falso*' (SMNH Type Coll'n 4976, one specimen), the other with a pre-printed 'Port Natal ... Wahlberg' label (SMNH Type Coll'n 4977, 14 specimens). No Krauss labels.

Type status: Possible syntypes. Although this species was listed amongst the alcohol material received by Krauss from Stockholm, there is no Krauss label with any of the SMNH material and thus no proof that he returned the specimens sent, after examination. The existing SMNH specimens, can thus at best be considered possible syntypes. The presence of a pre-printed 'Port Natal ... Wahlberg' label should not be taken as evidence against their type status. There may be additional extant types in Stuttgart Museum (Janus 1961). There is a fourth contemporary lot (24 specimens in alcohol) labelled '*C. tigrinus* var.' with a pre-printed 'Port Natal ... Wahlberg' label.

Taxonomy: A synonym of *Ischnochiton textilis* (Gray, 1828) (Kaas & van Belle 1990: 117). [Ischnochitonidae]

trigona, as variety of *Mytilus perna* Lamk. [*sic*] Linnaeus, 1758 – Krauss, 1848: 24. '*Natakküste*'. No contemporary material in SMNH.

Taxonomy: Not regarded as distinct from *Perna perna* (Linnaeus, 1758). [Mytilidae]

****tropica**, *Physa* – Krauss, 1848: 84, pl. 5, fig. 12. '*In flumine Lepenula (inter 25–26° lat. austr.); legit J. A. Wahlberg*'. SMNH material: 15 specimens collected by Wahlberg in '*den lilla sjön vid vägen till Lepenula*' [the little lake at the road to Lepenula] (a second label in same handwriting and on same paper states 'River Lepenula') (SMNH Type Coll'n 2114).

Type status: Probable paralectotypes. Connolly's figure of 'the type' in Stuttgart Museum (Connolly 1939: pl. 15, figs 38–39) is sufficient to constitute a lectotype designation. Although there is no Krauss label with the SMNH specimens, the species was listed amongst duplicates returned by Krauss to Stockholm (Table 1), and these SMNH specimens may thus be considered probable paralectotypes. Additional type material in BMNH was also figured by Connolly (1939: pl. 16, fig. 21).

Taxonomy: A species of *Bulinus* Müller, 1781 (Brown 1994: 229). [Planorbidae]

truncata, *Hyalaea* – Krauss, 1848: 34, pl. 2, fig. 12. '*In sinu falso*; J. A. Wahlberg'. SMNH material:

Although Wahlberg was cited as having collected this material, none could be traced in Stockholm.

Taxonomy: A junior primary homonym of *Hyalaea truncata* Lesueur, 1821. A form of *Cavolinia tridentata* (Forsskål in Niebuhr, 1775), the earliest available name for which is *kraussi* Tesch, 1913 (Spoel 1967: 97). [Cavoliniidae]

turgida, as variety of *Cardita variegata* Bruguière, 1792 – Krauss, 1848: 13. '*I–2 Klafter tief auf Steinen am Natalpoint*'. No contemporary material in SMNH.

Taxonomy: Not regarded as distinct from typical *Cardita variegata* (Barnard 1964: 458). [Carditidae]

*****turiformis*, *Bulimus*** – Krauss, 1848: 78, pl. 5, fig. 2. '*In terra natalensi*; legit J. A. Wahlberg'. SMNH material: One specimen from 'Port Natal' collected by Wahlberg (SMNH Type Coll'n 2111) and a second lot with 42 specimens bearing same data (SMNH Type Coll'n 4964). No Krauss label.

Type status: Probable paralectotypes. Connolly's discussion of the type material in Stuttgart (Connolly 1939: 339–40), is sufficient to constitute a lectotype designation, but the specimen is now presumably lost. Although there is no Krauss label with either of the SMNH lots, the species was listed amongst duplicate material that Krauss sent/returned to Stockholm (Table 1) and the specimens may thus be considered probable paralectotypes. They were almost certainly part of the original sample collected by Wahlberg.

Since Wahlberg's material evidently contained two species (Connolly 1939: 339), a neotype should be selected. The single specimen is presumably the 'reputed paratype' referred to by Connolly (1939: 340) and is in fact a specimen of *Euonyma acus* (Morelet, 1889).

Taxonomy: As interpreted by Connolly (1939: 339), this is a distinct species belonging to *Euonyma* Melvill & Ponsonby, 1896. [Subulinidae]

turrita, *Physa* – Krauss, ms. See *wahlbergi*, *Physa*.

uitenhagensis*, *Helix – Krauss in Pfeiffer, 1846 in 1841–46: 66; Krauss, 1848: 76, pl. 4, fig. 22. '*Uitenhagen prom. bon. spei*. (Krauss)' [Pfeiffer]; '*Ad radicem montis Winterhoeck in provinc. Uitenhagen*' [Krauss]. No contemporary material in SMNH. Connolly's discussion of 'the type' in Stuttgart (Connolly 1939: 230, pl. 7, figs 1–3), citing its dimensions and providing a figure, is sufficient to constitute a lectotype designation, but the specimen is now presumed lost.

Taxonomy: A species of *Trachycystis* Pilsbry, 1893 (Connolly 1939: 230). [Charopidae]

umlaasiana*, *Auricula – Krauss in Küster, 1843 in 1841–45: 43 [1844], pl. 6 [1843], figs 16–18; Krauss, 1848: 82. '*An der Ausmündung des Umlaasflusses (Natalküste) in südlichen Afrika*' [Küster]. No contemporary material in SMNH. Connolly's illustration of 'the type' in Stuttgart (Connolly 1939: 468, pl. 15, fig. 29) constitutes a lectotype designation, but the specimen is now presumed lost.

Taxonomy: Treated as a valid species of *Melampus* Montfort, 1810, by Connolly (1939: 468). The written description of this species was published one year after the illustration, but since the publication of a figure and name, prior to 1931, is considered to constitute a valid description (ICZN Art. 12(b)(7)), the date of this name must be given as 1843. [Ellobiidae]

umlaasiana*, *Nerita – Krauss, 1848: 89, pl. 5, fig. 25. '*Ad ostium fluvii Knysna*'. No contemporary material in SMNH. Lectotype (des. Janus 1961: 4, pl. 2, figs 4–6) and four paralectotypes in Stuttgart Museum (MT 115 and MT 1150–53 respectively). Additional paralectotypes may be present in the Leiden Museum (van Bruggen 1992: 83). The original Latin locality cited is erroneous, but that given after the German remarks ('*An der Ausmündung des Umlaasflusses auf felschen....*'), as the specific name suggests, is clearly the correct locality. Two additional *ex* Krauss lots are present in the Senckenberg Museum (uncatalogued, *Umlaasfluß*, Natal; SMF 304752/1, *ab ora Umlaas*, Bronn Coll'n).

Taxonomy: A species of *Nerita* Linnaeus, 1758, and type species of the taxon *Amphinerita* Martens, 1887. [Neritidae]

variabilis, *Mytilus* – Krauss, 1848: 25, pl. 2, fig. 5. '*In sinu tabulari et in litore natalensi*'. No contemporary material in SMNH.

Taxonomy: A junior primary homonym of *Mytilus variabilis* Fischer, 1807 (Kilburn & Rippey 1982: 216). See *semistriatus* var. above. [Mytilidae]

variabilis, *Patella* – Krauss, 1848: 55, pl. 3, fig. 12. '*In litore natalensi*'. No contemporary material in SMNH.

Taxonomy: A junior primary homonym of *Patella variabilis* Röding, 1798 and *Patella variabilis* Risso, 1826. In addition to the typical form, Krauss also named three varieties of this species. Of these only var. *concolor* is non-homonymous and is the valid name for the species (Kilburn 1972: 393). Christiaens's

proposal (Christiaens 1973:154) of the substitute name *Patella fischeri* was unwarranted. See *concolor* above regarding current generic referral. [Patellidae]

***variabilis, Siphonaria** – Krauss, 1848: 59, pl. 4, fig. 4a. '*In sinu tabulari et in litore natalensi*'. No contemporary material in SMNH. Lectotype (des. Janus 1961: 10, pl. 4, figs 10–12) and 26 paralectotypes in Stuttgart Museum (MT 125 and MT 1250–12525 respectively). Additional paralectotypes may be present in the Leiden Museum (van Bruggen 1992: 83) and in the Senckenberg Museum (SMF 177779/4).

Taxonomy: A synonym of *Siphonaria concinna* Sowerby, 1824 (Hubendick 1946: 58). [Siphonariidae]

ventricosa, Petricola – Krauss, 1848: 2, pl. 1 fig. 1. '*In litore natalensi, rara*'. No contemporary material in SMNH.

Taxonomy: A synonym of *Gastrana abildgaardiana* (Spengler, 1798) (Barnard 1964: 550) = *G. matadoa* (Gmelin, 1791) (Kilburn & Rippey 1982: 187). [Tellinidae]

****vernica, Helix** – Krauss, 1848: 76, pl. 4, fig. 23. '*In terra natalensi; legit J. A. Wahlberg*'. SMNH material: Four specimens from 'Port Natal' collected by Wahlberg (SMNH Type Coll'n 4965), one specimen separated in capsule labelled as *minor* Pfeiffer, 1853, by Connolly.

Type status: Possible paralectotypes. Connolly's discussion of 'the type' in Stuttgart (Connolly 1939: 99), citing its dimensions, is sufficient to constitute a lectotype designation, but the specimen is now presumed lost. Even though the SMNH specimens were almost certainly part of the original sample collected by Wahlberg, the species was not included in Krauss's list of received/exchanged material and there is no proof that he had examined them. They can thus, at best, be considered possible paralectotypes. The specimen isolated as Pfeiffer's var. *minor* was discussed and illustrated by Connolly (1939: 100, pl. 2, figs 9–11) and may with some justification, be considered the lectotype of that taxon.

Taxonomy: A species of *Nata* Watson, 1934 (Connolly 1939: 99). [Rhytididae]

vesiculosus, Helix – Krauss, ms [for *Bulinus spadiceus* Menke in Pfeiffer, 1846]. See *caffer*, *Bulinus*.

****wahlbergi, Chiton** – Krauss, 1848: 36, pl. 3, fig. 1. '*In sinu tabulari*'. SMNH material: One partly disarticulated body plus two valves of a larger specimen (SMNH Type Coll'n 4981), from 'Port Natal'. No original labels.

Type status: Possible syntypes. Although this species is included in the list of duplicate material sent by Krauss to Stockholm (Table 1), there are no Krauss labels and the locality is not that cited in the original description. The specimens can at best be considered possible types. There may also be some extant syntypes in Stuttgart Museum (Janus 1961).

Taxonomy: A synonym of *Onithochiton literatus* (Krauss, 1848) (Kaas & van Belle 1998: 201). The Table Bay locality given by Krauss was erroneous, as the species is a subtropical east coast endemic, not known from the southern or western Cape (Kilburn & Rippey 1982: 140). [Chitonidae]

****wahlbergi, Iridina** – Krauss, 1848: 19, pl. 2, fig. 1. '*In fluvio dicto Simiarum (Affenfluss), ramo flumin. Limpopo; legit J. A. Wahlberg*'. SMNH material: two complete specimens (SMNH Type Coll'n 4504); the word '*Apfloden*' [= *Affenfluss*], is written on the left valve of one. There is a Krauss label stating '*zur Aufsicht von Lovén*' [for examination from Lovén]. The specimen bearing the locality data agrees with Krauss's original illustration in every detail, including the pattern of umbonal corrosion.

Type status: Syntypes. Connolly (1939: 618) stated that the type of this species was in Stockholm, strongly suggesting that there was no material in Stuttgart. Furthermore, since the species was included in the list of material that Krauss acknowledged receiving from Stockholm (Table 1), this indicates that at least some of this material was returned. Connolly's mention of the type does not constitute a lectotype designation and so both SMNH specimens have equal status and must be considered syntypes. One however, is clearly the figured specimen.

Taxonomy: Traditionally placed in *Aspatharia* Bourguignat, 1885 (e.g. Brown 1967: 487), but more recently referred to *Spathopsis* Simpson, 1900 (Mandahl-Barth 1988: 67; Appleton 1996: 38). Daget (1998: 109, 126), however, treats the species under *Chambardia* Servain, 1890, believing *Spathopsis* and *Chambardia* to be synonyms. [Mutelidae]

****wahlbergi, Murex** – Krauss, 1848: 111, pl. 6, fig. 13. '*In litore natalensi; legit J. A. Wahlberg. In Mus. Acad. Holm.*' [= *Museum Academie Holmensis* = Museum of the Academy in Stockholm]. SMNH material: One specimen (SMNH Type Coll'n 4966). Only an old exhibit label remains (Fig. 7), but this bears the text '*Krauss determiniert*'.

Type status: Holotype and figured specimen. This is the only occasion on which Krauss specifically stated that the material was in Stockholm and the specimen agrees in size, colour and sculptural detail with Krauss's original figure. Although Krauss did not specifically state that only one specimen was

available, his discussion of the species strongly suggests that this was the case. The specimen may thus be considered the holotype (Fig. 14).

Taxonomy: Regarded as a deep water form of *Nucella wahlbergi* (Krauss, 1848) (Kilburn & Rippey 1982: 90; Lorenz 1991). The cited locality '*In liore natalensi*' and the 'Port Natal' locality given on the exhibition label are clearly erroneous. The species ranges eastwards from the Atlantic Cape only as far as False Bay. [Muricidae]

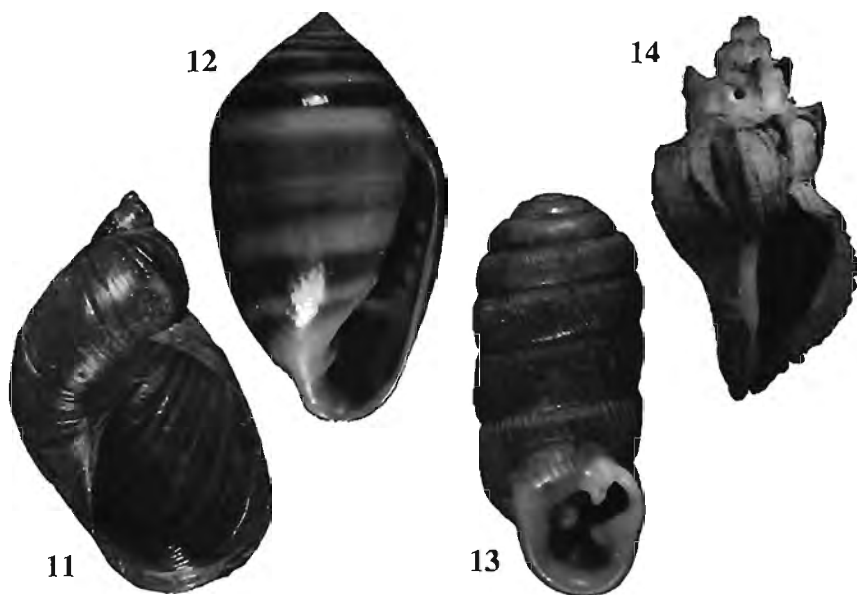
****wahlbergi. Physa** – Krauss, 1848: 84, pl. 5, fig. 13. '*In flumine Limpopo; legit J. A. Wahlberg*'. SMNH material: Five specimens with pre-printed 'Port Natal...Wahlberg' label (SMNH Type Coll'n 4567).

Type status: Probable syntypes. Although the label with this lot indicates the specimens to be from a locality other than the type locality, such 'Port Natal' labels are known to be suspect (see introduction). It is almost certain that these specimens were part of the original sample collected by Wahlberg in the Limpopo River. The species was not included in the list of received/exchanged material (Table 1), but the exhibit label states 'Krauss', above the species name, probably meaning 'from Krauss', since the author's name was usually written below the species name. It is possible that this is the material that was referred to under a manuscript name (*Physa turrita*) in the list of exchanged material. In view of the above and the fact that Connolly (1939: 507–9) did not mention the existence of a type in Stuttgart Museum, we consider these specimens probable syntypes.

Taxonomy: A synonym of *Bulinus forskalii* (Ehrenberg, 1831) (Brown 1994: 236). [Planorbidae]

****wahlbergi. Pupa** – Krauss, 1848: 80, pl. 5, fig. 5. '*In terra natalensi; legit J. A. Wahlberg*'. SMNH material: Three specimens collected in 'Port Natal' by Wahlberg (SMNH Type Coll'n 2112). No Krauss label.

Type status: Probable paralectotypes. Although Krauss stated that he owned (*besitze*) only two specimens, the species was listed amongst duplicate material which he sent/returned to Stockholm (Table 1) and thus these SMNH specimens may be considered probable types. Connolly's discussion of the two Stuttgart types (Connolly 1939: 87) is sufficient to constitute a lectotype designation (but both specimens now presumed lost), consequently the remaining SMNH specimens must be considered probable paralectotypes. As with the Stuttgart Museum lot (Connolly 1939: 87), the SMNH lot is probably composite. There are two moderately fresh specimens with axial sculpture on the base of the last whorl only and with weaker apertural dentition, and one rather poor specimen with axial sculpture almost



Figs 11–14. Krauss types in SMNH. 11. *Succinea amphibia* var. *africana* Krauss, 1848, paralectotype, length 16.2 mm (SMNH 4943). 12. *Auricula küsteri* Krauss, 1848, possible paralectotype, length 12.0 mm (SMNH 4569). 13. *Pupa pfeifferi* var. *miniata* Krauss, 1848, lectotype, length 5.6 mm (SMNH 4951). 14. *Murex wahlbergi* Krauss, 1848, holotype and figured specimen (SMNH 4966), length 36.3 mm.

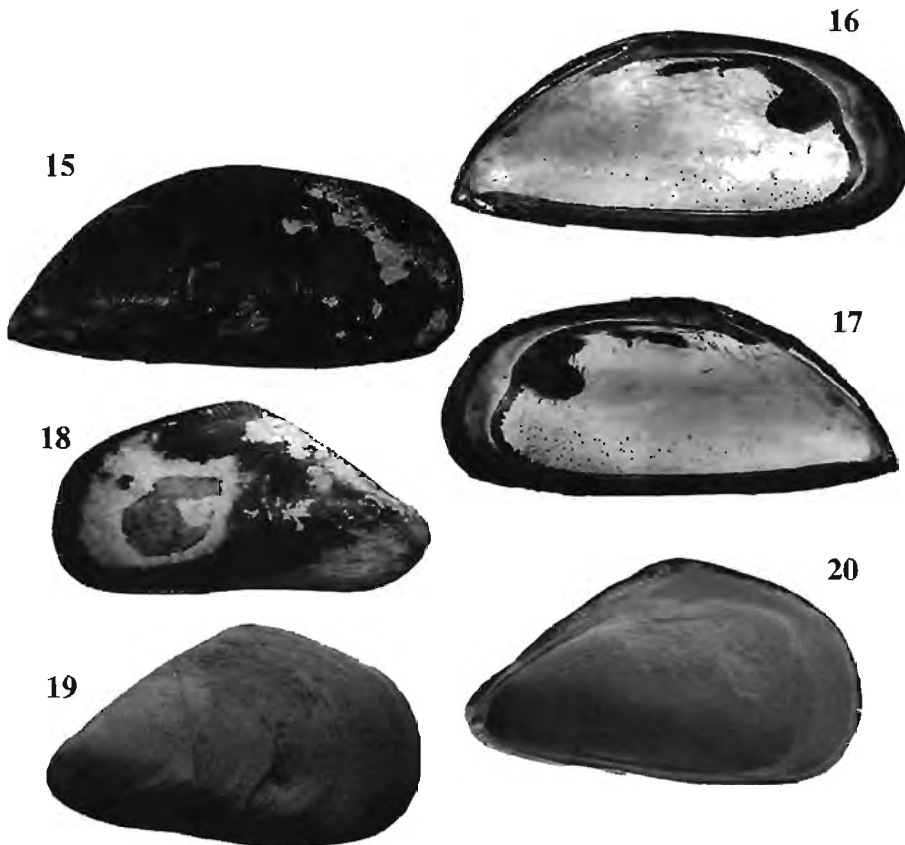
throughout and with strong apertural dentition. The latter represents the species as restricted by Connolly. Taxonomy: A species of *Gulella* Pfeiffer, 1856 (Connolly 1939: 86). [Streptaxidae]

wahlbergi, *Purpura* – Krauss, 1848: 118, pl. 6, fig. 15. '*In litore natalensi*'. No contemporary material in SMNH.

Taxonomy: A valid species referred to *Nucella* Röding, 1798, by Kilburn & Rippey (1982: 90), but anatomical confirmation required (Kool 1993: 55). *Murex wahlbergi* Krauss, 1848, is a deep-water form of this species. [Muricidae]

NEW TAXA DESCRIBED BY KRAUSS IN 1852

In 1852 Krauss published a short paper discussing molluscan material collected in the Cape by the botanist Carl Zeyher (1799–1858), in which he described six additional species. Although Krauss did not indicate where the original material of these species was deposited, Martens, who later figured some of the original specimens, stated that they were in the Stuttgart Museum (Martens 1904: pl. 3, figure legends). As with most of the species described by Krauss in 1848, one must now presume that this material has been lost.



Figs 15–20. Krauss types in SMNH. 15–17. *Mytilus meridionalis* Krauss, 1848, syntype, exterior of left valve and interior of both valves, length 11.0 mm (SMNH 4501). 18–20. *Mytilus variabilis* var. *semistriatus* Krauss, 1848, syntypes (SMNH 4502). 18. Exterior of right valve, length 16.0 mm. 19, 20. Exterior of left valve and interior of right valve, SEM, length 15.8 mm.

The species are included in the present catalogue in order to provide a complete list of the southern African taxa described by Krauss, but no original Zeyher material of any of them appears to have made its way the SMNH.

biplicata, *Marginella* – Krauss, 1852: 37. 'In litore capensi legit Zeyher'.

A junior primary homonym of *Marginella biplicata* Risso, 1826 (and of Lea, 1833). The earliest available name is *Marginella perla* Marrat, 1876 (Barnard 1959: 3), a species of *Hyalina* Schumacher, 1817. Original Stuttgart Museum specimen illustrated by Martens (1904: pl. 3, fig. 6), now presumed lost. [Marginellidae]

multizonata, *Marginella* – Krauss, 1852: 37. 'In litore capensi legit Zeyher'.

A synonym of *Hyalina cylindrica* (Sowerby, 1846) (Barnard 1974: 677). Original Stuttgart Museum specimen illustrated by Martens (1904: pl. 3, fig. 5), now presumed lost. [Marginellidae]

reevei, *Marginella* – Krauss, 1852: 38. 'In litore capensi legit C. Zeyher'.

A synonym of *Marginella neglecta* Sowerby, 1846 (Barnard 1959: 7), a species of *Dentimargo* Cossmann, 1899 (Kilburn & Rippey 1982: 113). Original Stuttgart Museum specimen illustrated by Martens (1904: pl. 3, fig. 3), now presumed lost. [Marginellidae]

zeyheri, *Marginella* – Krauss, 1852: 38. 'In litore capensi legit C. Zeyher'.

Considered a valid species by Barnard (1959: 10). Referable, in terms of shell morphology, to *Alaginella* Laseon, 1957 (D. H., pers. obs.). Original Stuttgart Museum specimen illustrated by Martens (1904: pl. 3, fig. 4), now presumed lost. [Marginellidae]

zeyheri, *Purpura* – Krauss, 1852: 35. 'In litore capensi legit Zeyher'.

Barnard (1974: 693) believed this to be a synonym of *Nucella dubia* (Krauss, 1848), but the matter requires further study. Additional material may be present in the Leiden Museum (van Bruggen 1992: 83). [Muricidae]

zeyheri, *Trochus* – Krauss, 1852: 33. 'In litore capensi legit C. Zeyher'.

A synonym of *Gibbula cicer* Menke in Philippi, 1844 (Barnard 1963b: 272). [Trochidae].

NOTE ON *TICHOGONIA KRAUSSII* KÜSTER, 1841

***Tichogonia kraussii* Küster, 1841: pl. 6, figs 1–6 – Krauss, 1848: 26. 'An der Natalküste'.

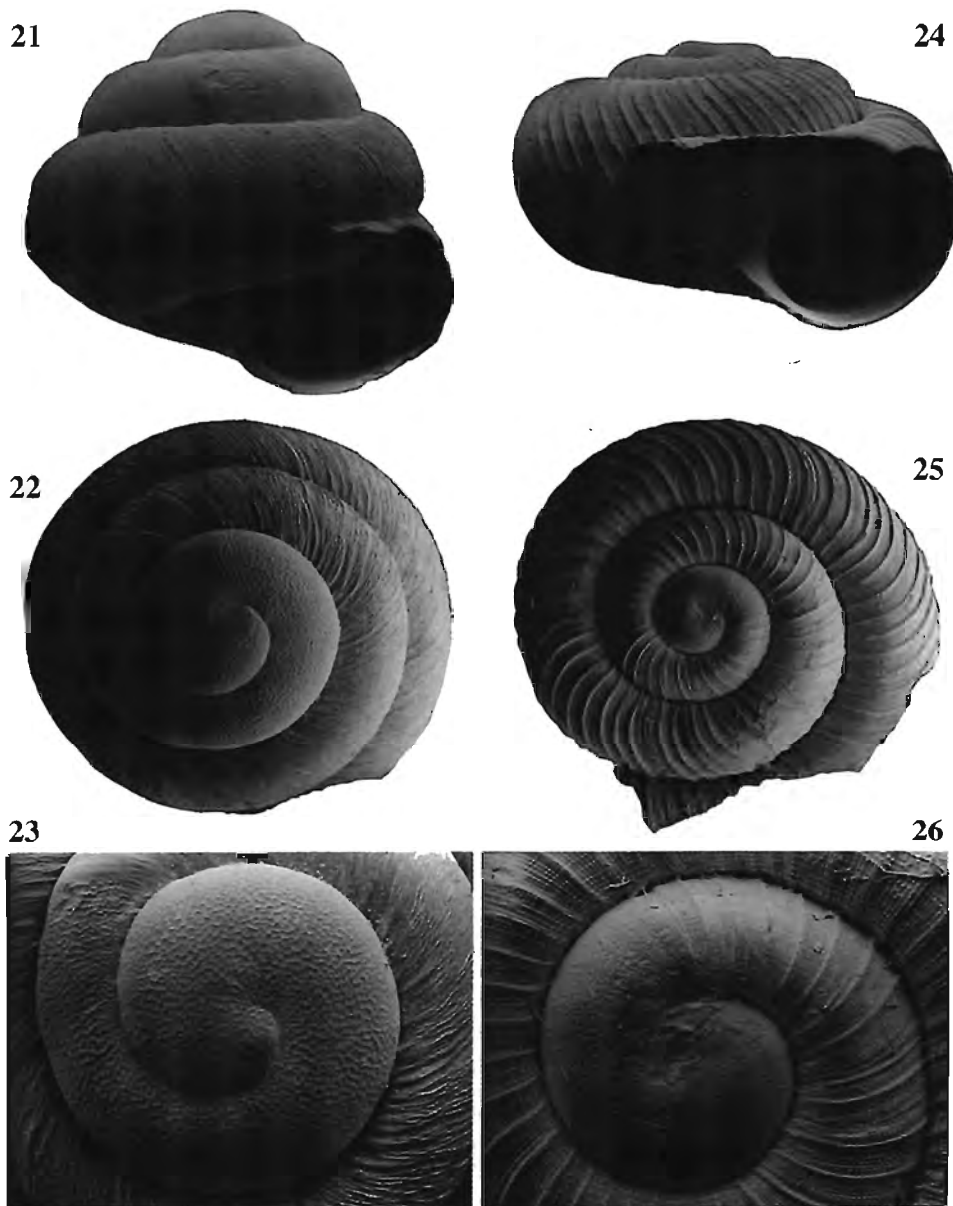
Küster's figure of this species, given in the *Conchylien-Cabinet* (Küster & Clessin, 1840–41, 1886–90), was published in 1841, although its description in this same work was only finalised and published (by Clessin) in 1886 (p.14), nearly forty years after Krauss (1848) had discussed the species. Since, prior to 1931, the publication of a figure and name constitutes a valid description (ICZN Art. 12(b)(7)), authorship of the name must be credited to Küster (1841). The species was listed (as *Tichogonia kraussii* Küst.) by Krauss as being amongst material received by him from Stockholm (Table 1), and two complete specimens are present in SMNH (SMNH Type Coll'n 4974). There is an original label stating that these were collected by Wahlberg in 'Port Natal', in 1839. There is also an original Krauss label. These may be considered probable syntypes.

Taxonomy: Krauss's discussion of this species suggests considerable uncertainty as to the distinctness of this taxon, but it is now widely recognised to be a synonym of the Indo-Pacific *Septifer bilocularis* (Linnaeus, 1758) (Prashad 1932: 69), a common species on the KwaZulu-Natal coast. The SMNH types confirm this. [Mytilidae]

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Figs 21–26. Krauss types in SMNH. 21–23. *Helix microscopica* Krauss, 1848, syntype (SMNH 2108), shell diameter 1.43 mm, protoconch diameter 0.85 mm. 24–26. *Helix rivularis* Krauss, 1848, holotype (SMNH 2110), shell diameter 2.27 mm, protoconch diameter 0.65 mm

REFERENCES

- ADAM, W. & LELOUP, E. 1938. Résultats scientifiques du voyage aux Indes Orientales Néerlandaises. *Mémoires du Musée Royal d'Histoire Naturelle de Belgique* **2** (19): 1–209.
- ALLANSON, B. R. 1959. On the systematics and distribution of the molluscan genus *Siphonaria* in South Africa. *Hydrobiologia* **12**: 149–180.
- APPLETON, C. C. 1996. *Freshwater molluscs of southern Africa*. Pietermaritzburg: University of Natal Press.
- BARNARD, K. H. 1959. Contributions to the knowledge of South African marine Mollusca. Part II. Gastropoda: Prosobranchiata: Rachiglossa. *Annals of the South African Museum* **45** (1): 1–237.
- 1963a. Contributions to the knowledge of South African marine Mollusca. Part III. Gastropoda: Prosobranchiata: Taenioglossa. *Annals of the South African Museum* **47** (1): 1–199.
- 1963b. Contributions to the knowledge of South African marine Mollusca. Part IV. Gastropoda: Prosobranchiata: Rhipidoglossa, Docoglossa. Tectibranchiata. Polyplacophora. Solenogastres. Scaphopoda. *Annals of the South African Museum* **47** (2): 201–360.
- 1964. Contributions to the knowledge of South African marine Mollusca. Part V. Lamellibranchiata. *Annals of the South African Museum* **47** (3): 361–593.
- 1974. Contributions to the knowledge of South African marine Mollusca. Part VII. Revised fauna list. *Annals of the South African Museum* **47** (5): 663–781.
- BEQUAERT, J. C. 1950. Studies in the Achatinidae, a group of African land snails. *Bulletin of the Museum of Comparative Zoology, Harvard* **105** (1): 1–216, pls 1–81.
- BERGH, R. 1907. The Opisthobranchiata of South Africa. *Transactions of the Philosophical Society of South Africa* **17**, being *Marine Investigations in South Africa* **5**: 1–144.
- BIELER, R. 1993. Architectonicidae of the Indo-Pacific (Mollusca, Gastropoda). *Abhandlungen des Naturwissenschaftlichen Vereins in Hamburg* **30**: 1–377. Stuttgart: G. Fischer.
- BOSS, K. J. 1969. The subfamily Tellininae in South African waters (Bivalvia, Mollusca). *Bulletin of the Museum of Comparative Zoology, Harvard* **138** (4): 81–162.
- BRINK, P. 1955. Swedish exploration of southern African animal life during 200 years. Vol. 1: 11–61. In: Hanström, B., Brink, P. & Rudebeck, G., eds, *South African Animal Life – results of the Lund University Expedition in 1950–1951*. Stockholm: Almqvist & Wiksell.
- BROWN, D. S. 1967. A review of the freshwater Mollusca of Natal and their distribution. *Annals of the Natal Museum* **18** (3): 477–494.
- 1994. *Freshwater snails of Africa and their medical importance*. Second ed'n. London: Taylor & Francis Ltd.
- BROWN, D. S., CURTIS, B. A., BETHUNE, S. & APPLETON, C. C. 1992. Freshwater snails of east Caprivi and the lower Okavango River basin in Namibia and Botswana. *Hydrobiologia* **246**: 9–40.
- BRUGGEN, A. C. VAN 1965. Two new species of Achatinidae (Mollusca, Gastropoda, Pulmonata) from the Drakensberg Range, with general remarks on southern African Achatinidae. *Revue de Zoologie et de Botanique Africaine* **71** (1–2): 79–91.
- 1985. The terrestrial molluscs of Lesotho (southern Africa), a first contribution, with detailed notes on *Archachatina machachensis* (Mollusca, Gastropoda). *Proceedings of the Koninklijke Nederlandse Akademie van Wetenschappen, Series C* **88** (3): 267–296.
- 1992. Ferdinand Krauss and the Leiden Museum, with notes on his South African mollusc types. *Proceedings of the Ninth International Malacological Congress, Edinburgh* pp. 77–96.
- CHAMBERS, R. J. & McQUAID, C. D. 1994. Notes on the taxonomy, spawn and larval development of South African species of *Siphonaria* (Gastropoda: Pulmonata). *Journal of Molluscan Studies* **60** (3): 263–275.
- CHRISTIAENS, J. 1973. Révision du genre *Patella* (Mollusca, Gastropoda). *Informations de la Société Belge de Malacologie, Series 2, No 9*: 153–155.
- 1987. Red Sea malacology IV. Revision of limpets of the Red Sea (Patellidae, Fissurellidae and the genus *Hemitoma*). *Gloria Maris* **26** (2–3): 17–54.
- CLESSIN, S. 1899–1902. Die Familie der Eulimidae. In: Martini, F. H. W. & Chemnitz, J. H., *Systematisches Conchylien-Cabinet*. Second edition, ed. H. C. Küster. Nürnberg: Bauer & Raspe **1** (28).
- COOMANS, H. E., MOOLENBEEK, R. G. & WILS, E. 1983. Alphabetical revision of the (sub) species in Recent Conidae 6. *cabritii* to *cinereus*. *Basteria* **47**: 67–143.
- CONNOLLY, M. 1932. New South African *Gulellae*, with notes on certain other species. *Annals of the Natal Museum* **7**: 67–90.
- 1939. A monographic survey of South African non-marine Mollusca. *Annals of the South African Museum* **33**: 1–660.
- DAGET, J. 1998. Catalogue raisonné des mollusques bivalves d'eau douce Africains. Leiden/Paris: Backhuys Publishers/Orstom.

- DAVIES, B. R. 1980. The identification of the mytilids *Musculus virgiliae* Barnard, *Arcuatula capensis* (Krauss) and *Brachidontes variabilis* (Krauss), with corrections to the literature and a note on their distribution. *Transactions of the Royal Society of South Africa* **44** (2): 225–236.
- DUNCAN, F. M. 1937. On the dates of publication of the society's 'Proceedings' 1859–1926. With an appendix containing the dates of publication of the 'Proceedings' 1830–1858, compiled by the late F. H. Waterhouse, and of the 'Transactions' 1833–1869, by the late Henry Peavot, originally published in PZS 1893, 1913. *Proceedings of the Zoological Society of London* **107** series A: 71–84.
- EDMUNDS, M. & THOMPSON, T. E. 1972. Opisthobranchiate Mollusca from Tanzania IV. Pleurobranchomorpha, Dendronotoidea and Arminoidea. *Proceedings of the Malacological Society of London* **40**: 219–234.
- GOSLINER, T. 1987. *Nudibranchs of Southern Africa. A Guide to Opisthobranch Molluscs of Southern Africa*. California: Sea Challengers.
- GRAY, J. E. IN GRAY, M. E. 1842–57. Figures of molluscan animals, selected from various authors **4** (1850): iv, 219 pp. London.
- GUNN, M. & CODD, L. E. 1981. *Botanical exploration of southern Africa*. Cape Town: A. A. Balkema.
- GYLDENSTOLPE, N. 1934. The travels and collections of Johan August Wahlberg, 1810–1856: a pioneer naturalist in South Africa. *Ibis* **4**: 264–292.
- HERBERT, D. G. 1992. Revision of the Umboniinae (Mollusca: Prosobranchia: Trochidae) in southern Africa and Mozambique. *Annals of the Natal Museum* **33** (2): 379–459.
- 1996. A critical review of the trochoidean types in the Muséum d'Histoire Naturelle, Bordeaux (Mollusca: Gastropoda). *Bulletin du Muséum National d'Histoire Naturelle, Paris*. 4th Series, **18**, section A, nos 3–4: 409–445.
- 1997. The terrestrial slugs of KwaZulu-Natal: diversity, biogeography and conservation (Mollusca: Pulmonata). *Annals of the Natal Museum* **38**: 197–239.
- HOUART, R. 1995. *Pteryomarchia* n. gen. and *Vaughtia* n. gen., two new muricid genera (Gastropoda, Muricidae: Muricinae and Ocenebrinae). *Apex* **10** (4): 127–136.
- HUBENDICK, B. 1946. Systematic monograph of the Patelliformia. *Kungliga Svenska Vetenskapakademiens Handlingar* **23** (5): 2–93, pls i–vi.
- HOUBRICK, R. S. 1992. Monograph of the genus *Cerithium* Bruguière in the Indo-Pacific (Cerithiidae: Prosobranchia). *Smithsonian Contributions to Zoology* **510**, 211 pp.
- JANUS, H. 1961. Die Typen und Typoide südafrikanischer Meeresmollusken im Staatlichen Museum für Naturkunde in Stuttgart. *Stuttgarter Beiträge zur Naturkunde aus dem Staatlichen Museum für Naturkunde in Stuttgart* **70**: 1–19.
- KAAS, P. & VAN BELLE, R. A. 1987. *Monograph of living chitons*. Vol. 3. Leiden: Backhuys.
- 1990. *Monograph of living chitons*. Vol. 4. Leiden: Backhuys.
- 1998. *Catalogue of living chitons (Mollusca, Polyplacophora)*. Second ed'n. Leiden: Backhuys.
- KILBURN, R. N. 1971. A revision of the littoral Conidae (Mollusca: Gastropoda) of the Cape Province. *Annals of the Natal Museum* **21** (1): 37–54.
- 1972. Taxonomic notes on South African marine Mollusca (2), with the description of new species and subspecies of *Conus*, *Nassarius*, *Vexillum* and *Demoulia*. *Annals of the Natal Museum* **21** (2): 391–437.
- 1977. Taxonomic studies on the marine Mollusca of southern Africa and Mozambique. Part 1. *Annals of the Natal Museum* **23** (1): 173–214.
- 1983. The Recent Arcidae (Mollusca: Bivalvia) of southern Africa and Mozambique. *Annals of the Natal Museum* **25** (2): 511–548.
- 1985. The family Epitoniiidae (Mollusca: Gastropoda) in southern Africa and Mozambique. *Annals of the Natal Museum* **27** (1): 239–337.
- KILBURN, R. N. & RIPPEY, E. 1982. *Sea shells of southern Africa*. Johannesburg: Macmillan.
- KOCH, H. J. 1949. A review of the South African representatives of the genus *Patella* Linnaeus. *Annals of the Natal Museum* **11** (3): 487–517.
- KOHN, A. J. 1981. Type specimens and identity of the described species of *Conus* VI. The species described 1801–1810. *Zoological Journal of the Linnean Society* **71**: 279–341.
- KOOL, S. P. 1993. The systematic position of *Nucella* (Prosobranchia: Muricidae: Ocenebrinae). *Nautilus* **107** (2): 43–57.
- KRAUSS, F. 1848. *Die südafrikanischen Mollusken. Ein Beitrag zur Kenntniss des Kap- und Natallandes und zur geographischen Verbreitung derselben, mit Beschreibung und Abbildung der neuen Arten*. Stuttgart: Ebner & Seubert i–ii, 140p, 6pls.
- 1852. Neue Kap'sche Mollusken, als Zusatz zu meiner Schrift: 'Die Südafrikanischen Mollusken'. *Archiv für Naturgeschichte* **18** (1): 29–40.

- . 1973. Travel journal / Cape to Zululand. Observations by a collector and naturalist 1838–40. Ed. O. H. Spohr. Cape Town: A. A. Balkema.
- KÜSTER, H. C. 1841–45. Die Ohrschnecken (Auriculacea) in Abbildungen nach der Natur mit Beschreibungen. In: Martini, F. H. W. & Chemnitz, J. H., *Systematisches Conchylien-Cabinet*. Second edition, ed. Küster, H. C. Nürnberg: Bauer & Raspe, 1 (16: 1).
- . 1841–55. Fünfte Abtheilung der Heliceen, *Pupa* und *Vertigo*. In: Martini, F. H. W. & Chemnitz, J. H., *Systematisches Conchylien-Cabinet*. Second edition, ed. Küster, H. C. Nürnberg: Bauer & Raspe, 1 (15).
- KÜSTER, H. C. & CLESSIN, S. 1840–41, 1886–90. Die Familie der Mytilidae in Abbildungen nach der Natur mit Beschreibungen. In: Martini, F. H. W. & Chemnitz, J. H., *Systematisches Conchylien-Cabinet*. Second edition, ed., Küster, H. C. Nürnberg: Bauer & Raspe, 8 (3).
- KÜSTER, H. C. DUNKER, W. & CLESSIN, S. 1841–50, 1878–86. Die Familie der Limnaeiden enthaltend die Genera *Planorbis*, *Limnaeus*, *Physa* und *Amphipeplea*. In: Martini, F. H. W. & Chemnitz, J. H., *Systematisches Conchylien-Cabinet*. Second edition, ed., Küster, H. C. Nürnberg: Bauer & Raspe, 1 (17a).
- LÖNNBERG, E. 1916. Riksmuseum, 1819–41. In: *Naturhistoriska Riksmuseet Historia dess uppkomst och utveckling*. Stockholm: Almqvist & Wiksells Boktryckeri-Aktiebolag.
- LORENZ, F. 1991. A new subspecies of *Nucella wahlbergi* (Krauss, 1848) and notes on some South African Muricidae. *Schriften zur Malakozoologie* 4: 55–61.
- MANDAHL-BARTH, G. 1988. *Studies on African freshwater bivalves*. Charlottenlund: Danish Bilharziasis Laboratory.
- MARTENS, E. VON, "1903" [1904]. Die beschaltten Gastropoden der Deutschen Tiefsee-Expedition 1898–1899. A. Systematisch-geographischer Teil. *Wissenschaftliche Ergebnisse der deutsche Tiefsee-Expedition auf dem Dampfer "Valdivia"*. 7 (A):1–146 [see Weaver & DuPont 1970: 353 for dating].
- MARTINI, F. H. W. 1769. *Neues systematisches Conchylien-Cabinet*. 1: 1–408, pls 1–31. Nürnberg: G. N. Raspe.
- MCLEAN, J. H. 1984. Systematics of *Fissurella* in the Peruvian and Magellanic faunal provinces (Gastropoda: Prosobranchia). *Contributions in Science, Los Angeles County Museum* No 354: 1–70.
- MCLEAN, J. H. & KILBURN, R. N. 1986. Propodial elaboration in southern African and Indian Ocean Fissurellidae (Mollusca: Prosobranchia) with descriptions of two new genera and one new species. *Contributions in Science, Los Angeles County Museum* No 379: 1–12.
- NORMAN, M. D. & SWEENEY, M. J. 1997. The shallow-water octopuses (Cephalopoda : Octopodidae) of the Philippines. *Invertebrate Taxonomy* 11: 89–140.
- NYST, H. 1871. Tableau synoptique et synonomique des espèces vivantes et fossiles du genre *Scalaria*. *Annales de la Société Malacologique de Belgique* 6: 77–147.
- OLIVER, P. G. 1985. A comparative study of two species of Striarciinae from Hong Kong with comments on specific and generic systematics. In: Morton, B. & Dudgeon, D. eds, *The Malacofauna of Hong Kong and southern China II: Proceedings of the second international workshop on the malacofauna of Hong Kong and southern China, Hong Kong, 1983*. Hong Kong: Hong Kong University Press, Vol. 1, pp 283–310.
- . 1992. *Bivalved seashells of the Red Sea*. Wiesbaden: Christa Hemmen and Cardiff: National Museum of Wales.
- OLIVER, P. G. & CHESNEY, H. C. G. 1994. Taxonomy of Arabian bivalves. Part 1. Arcoidea. *Journal of Conchology, London* 35: 17–31.
- PFEIFFER, L. 1841–46. *Symbolae ad historiam heliceorum*. 3 vols, Casellis. [1: 1841, 2: 1842, 3: 1846].
- . 1848. *Monographia heliceorum viventium, sistens descriptiones systematicas et criticas omnium huius familiae generum et specierum hodie cognitarum*. Lipsiae: Brockhaus. Vol. 2.
- . 1854. Descriptions of sixty-six new land shells, from the collection of H. Cuming, Esq. *Proceedings of the Zoological Society of London* 20 (1852): 56–70.
- PHILIPPI, R. A. 1842–50. *Abbildungen und Beschreibungen neuer oder wenig gekannter Conchylien, unter Mithülse mehrerer deutscher Conchyliologen*. Cassel: Theodore Fischer, 3 vols.
- . 1848. *Centuria altera testaceorum novorum*. *Zeitschrift für Malakozoologie* 5 (1848): 17–27.
- . 1852–53. Die Gattungen *Delphinula*, *Scissurella* und *Globulus*. In: Martini, F. H. W. & Chemnitz, J. H., *Systematisches Conchylien-Cabinet*. Second edition, ed. Küster, H. C. Nürnberg: Bauer & Raspe, 2 (4): 1–57.
- PILSBRY, H. A. 1890. Stomatellidae, Scissurellidae, Pleurotomariidae, Haliotidae, Scutellinidae, Addisoniidae, Cocculinidae, Fissurellidae. In: Tryon, G. W. *Manual of Conchology*. Philadelphia: Academy of Natural Sciences, 12: 1–323, pls 1–64.
- . 1904–5. African Achatinidae. In: Tryon, G. W. *Manual of Conchology*, (2) Vol. 17.

- PONDER, W. F. 1985. A review of the genera of the Rissoidae (Mollusca: Mesogastropoda: Rissoacea). *Records of the Australian Museum*, Supplement 4, 221 pp.
- PONDER, W. F. & WORSFOLD, T. M. 1994. A review of the rissoiform gastropods of southwestern South America. *Contributions in Science, Natural History Museum of Los Angeles County*, No. 445: 1–63.
- PONDER, W. F. & YOO, E. K. 1977. A revision of the Eatoniellidae of Australia (Mollusca, Gastropoda, Littorinacea). *Records of the Australian Museum* 31 (15): 606–658.
- PRASHAD, B. 1932. The Lamellibranchia of the "Siboga" Expedition. Systematic Part, II. Pelecypoda (exclusive of Pectinidae). *Siboga Expeditie 1899–1990*, 53c: 1–353, Leiden: E. J. Brill.
- REEVE, L. 1848. Monograph of the genus *Turbo*. *Conchologica Iconica* 4, pls 1–13, London: Lovell Reeve.
- REID, D. G. 1989. The comparative morphology, phylogeny and evolution of the gastropod family Littorinidae. *Philosophical Transactions of the Royal Society of London*, B, 324: 1–110.
- RIDGWAY, S. A., REID, D. G., TAYLOR, J. D., BRANCH, G. M. & HODGSON, A. N. 1998. A cladistic phylogeny of the family Patellidae (Mollusca: Gastropoda). *Philosophical Transactions of the Royal Society of London*, B, 353: 1645–1671.
- RIDGWAY, T. M., BRANCH, G. M. & STEWART, B. A. 1999. *Patella granularis* Krauss, 1848: redescription of an unrecognised limpet from the east coast of South Africa. *Journal of Molluscan Studies* 65: 139–142.
- RIDGWAY, T. M., STEWART, B. A., BRANCH, G. M. & HODGSON, A. N. 1998. Morphological and genetic differentiation of *Patella granularis* (Gastropoda: Patellidae): recognition of two sibling species along the coast of southern Africa. *Journal of Zoology, London* 245: 317–333.
- ROBSON, G. 1986. A new species of South African limpet, *Patella aphanes*, (Mollusca: Gastropoda: Patellidae), with a discussion of *P. oblecta* Krauss, 1848. *Durban Museum Novitates* 13 (22): 305–320.
- ROELEVELD, M. A. 1974. Cephalopoda, pp 743–752, in Barnard, K. H. Contributions to the knowledge of South African marine Mollusca. Part VII. Revised fauna list. *Annals of the South African Museum* 47 (5): 663–781.
- ROSEWATER, J. 1970. The family Littorinidae in the Indo-Pacific. Part I. The subfamily Littorininae. *Indo-Pacific Mollusca*, 2 (12): 417–506.
- SHERBORN, C. D. 1922–33. *Index animalium sive index nominen quae ab A.D. MDCCLVIII generibus et speciebus animalium imposita sunt*. London: British Museum.
- SIRGEL, W. F. 1985. A new subfamily of Arionidae (Mollusca: Pulmonata). *Annals of the Natal Museum* 26 (2): 471–487.
- SMITH, E. A. & ENGLAND, H. W. 1937. Martini and Chemnitz (Kuester's edition) systematisches Conchylien-Cabinet, 1837–1920. *Journal of the Society for the Bibliography of Natural History* 1 (4): 89–99.
- SPOEL, S. VAN DER 1967. *Euthecosomata – a group with remarkable developmental stages*. Gorinchem: Noorduijn en Zoon N. V.
- THIELE, J. 1912–19. Scissurelliden und Fissurelliden. In: Martini, F. H. W. & Chemnitz, J. H., *Systematisches Conchylien-Cabinet*. Second edition, ed. Küster, H. C. Nürnberg: Bauer & Raspe, 2 (4a): 1–168, pls 1–20.
- VIDAL, J. 1994. A review of the genus *Fulvia* Gray, 1853 (Mollusca, Cardiidae). *Apex* 9 (4): 93–118.
- WAHLBERG, J. A. 1994. Travel journals (and some letters) South Africa and Namibia/Botswana, 1838–1856. Eds Craig, A. and Hummel, C. Cape Town: van Riebeeck Society, second series No 23 (for 1992).
- WEAVER, C. S. & DUPONT, J. E. 1970. *Living volutes. A monograph of the Recent Volutidae of the world*. Delaware Museum of Natural History, monograph series No. 1. Greenville, Delaware.
- ZILCH, A. 1959–60. Euthynera. In: Wenz, W., *Handbuch der Paläozoologie*. Berlin: Gebrüder Borntraeger, 6 (2): 1–834.
- 1985. Die Typen und Typoide des Natur-Museums Senckenberg, 76: Mollusca: Pupillacea(6): Enidae: Spelaeoconchinae, Cerastuinae, Draparnaudiinae. *Archiv für Molluskenkunde* 116 (4/6): 233–250.